The Chemical Age

VOL LXV 17 NOVEMBER 1951 No 1688

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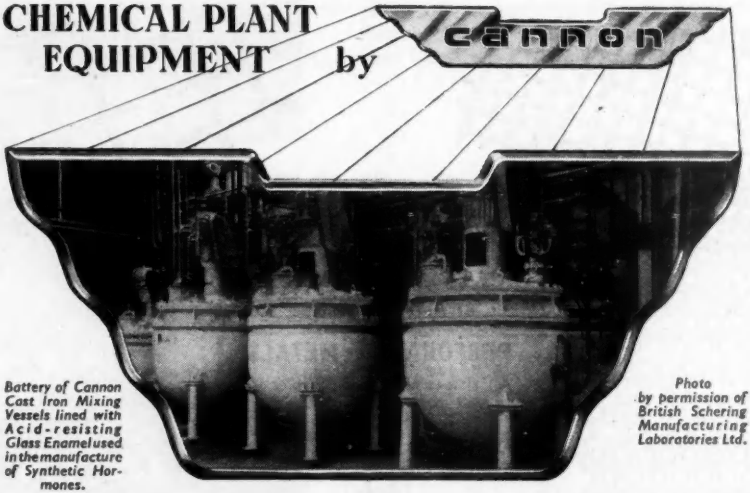

Battery of Cannon Cast Iron Mixing Vessels lined with Acid-resisting Glass Enamel used in the manufacture of Synthetic Hormones.

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Our Daily Bread

BEFORE the Conference of the Food, Agriculture, and Fine Chemicals Groups of the S.C.I. was held at the end of September, it was strongly urged in these pages that publication of the papers should not be unduly delayed. It was therefore gratifying to see Dr. Amos's paper on chemicals used in flour and bread, published in full in *Chemistry and Industry* as speedily after the conference as 10 November. A time-gap between delivery and printing that is sometimes as much as six months has in this case been reduced to six weeks. With the increasing tendency for manifestations of public alarm about chemical additives in food, this speedy publicity for scientific views on what must always be essentially a scientific subject is most commendable. Nor would any other choice for the first paper to be published have bettered the choice made—bread is, above all, the most universally consumed foodstuff and the 'Agene' controversy, rightly or wrongly, has played a major part in heightening general public apprehension about chemicals in food.

No charge of special pleading can be made against Dr. Amos. His paper is a clear and impartial survey of the reasons why chemicals are added to flour and of the evidence that supports or questions their use. It is not a paper that can be readily understood only by scientists and bread industry experts; most reasonably intelligent laymen would follow Dr. Amos's arguments without difficulty. Indeed, it might be suspected that the author made very careful efforts to ensure this. The need for chemical additives has been explained with a painstaking clarity and any open-minded person, whether or not describable as 'technical,' will realise that the various chemical substances employed by millers and bakers are not used to produce a spurious quality in bread but are, in fact, required for the production of those types of bread which the public mainly demand. Is it sufficient that this paper has now been published in a scientific society's journal? We suggest that this is grossly insufficient having regard to the highly coloured background of public debate about chemicals used in the food industry. Both the milling and the baking industries should widely distribute copies of this paper, making sure, as far as is possible, that it reaches a significant cross-section of the public.

The pros and cons of 'Agene' as an improver have been considerably debated on both sides of the Atlantic. It is not generally realised that no evidence has yet proved that 'Agene' (or nitrogen trichloride) at the rates used in bread production is harmful to man. Its harmfulness has been shown only in experiments with dogs, in which, as is well known, canine hysteria was produced; and in some similar experiments with ferrets and rabbits. Nevertheless, the use of 'Agene' as an improver has been discontinued in the United States and will be discontinued in this country as soon as supplies of an alternative improver can fully replace it. But it seems highly important that the public should know that this action, both here and in America, has been taken as a precaution against the possibility that 'Agene' may be harmful to man and not as an admission that it is, or ever has been, harmful. It is very easy for voluble anti-chemical propagandists—and there are many of them, motivated by a variety of purposes—to say to the public, 'Look at the tonnage of 'Agene' that has been put into your bread over the past twenty years—and the use of this hysteria-producing chemical has only recently been stopped!' The public must be told both sides of the story, and notably that a Ministries of Health and Food joint report stated in 1950 that no evidence that 'Agenised' flour is harmful to man could be found, not even from experiments in which heavily 'Agenised' flour had been fed at a high level. Moreover, that such tests have been carried out with human beings who possess epileptic tendencies. The 'Agene' story should be made known in its true colours, which stand somewhere between green and amber and certainly nowhere near red.

As for the various other chemicals used in flour and bread-making, the maturity-hasteners, the yeast-feeders, the bleachers, Dr. Amos's paper shows that the residues from these treatments are small in amount and usually much smaller than residues of the same or similar substances long tolerated in other foods. Bread must be made and if we now or in future use greater proportions of wheat with weaker dough-making qualities than that of high-grade American wheat our bread will become less attractive to most consumers unless chemical improvers are employed to enhance natural properties. The vast mass of the public like their bread white, and are likely to eat less bread if it is not, so a ban on flour-bleachers would lead to a lower standard of national nutrition, particularly among the lower income groups. Sufficiently long storage will mature flour so that it possesses optimum bread-making qualities; the maturity-hastening improvers need not then be used. But today and no doubt for years to come the time needed for natural maturing cannot be given. Chemical 'flour agers' are essential if a sufficient national quantity of bread is to be kept steadily available for our population of more than fifty millions. These basic facts must be made known and much more widely.

On Other Pages

The annual subscription to THE CHEMICAL AGE is 35s. Single copies, 9d.; post paid, 1s.; SCOTTISH OFFICE: 116 Hope Street, Glasgow (Central 3954/5). MIDLANDS OFFICE: Daimler House, Paradise Street, Birmingham (Midland 0784-5). THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers, Limited.

Notes & Comments

The Future of Chemistry

EVEN to attempt to predict the view ahead in chemistry would require a bold man, willing to risk derision if he were really able to foretell some of the immense possibilities. C. E. Kenneth Mees, Eastman-Kodak Co., speaking on this subject in his address at the recent Diamond Jubilee banquet of the American Chemical Society in New York, wisely confined his remarks to the generally recognised responsibilities which the chemist must accept for the application of science to the needs of the future. The position is a curious one, for while solving one problem the chemist, all too often, unwittingly sets himself another. The aid of chemistry has, for example, been largely responsible for mitigating the effects of disease, thus bringing about the task of making available greater quantities of food for an increasing population. While, as Mees pointed out, it is largely to the scientist that the public is looking for the rise in production necessary to maintain the standard of living, the function of science should not be regarded as merely a means to easier existence. No longer is it necessary to appeal for the support of science by industry, but rather is it quite seriously threatened by the possibility of outside control. Technological work can, and indeed should, be planned, but the scientist must be free to pursue his investigations and search for truth wherever the spirit may lead him. Whether his researches are applied for the benefit or detriment of mankind must ultimately rest with the layman.

A Change of Policy

WITH every means of communication with the outside world under official scrutiny, it would seem to signify a change in Russian scientific policy that Russia and the satellite countries have recently begun once more to send out technical scientific literature to foreign countries. Gradually and almost imperceptibly new as well as old publications have been making their appearance from Hungary, Czechoslovakia and Russia. Some have not been seen before in the West and they are printed in English as well as their native language. It is difficult to see a precise reason for this rather abrupt *volte-face*, with international relations as strained as they have ever been, but any gesture making for the free exchange of knowledge is a welcome one and should be encouraged. Most important, perhaps, is the reception in Canada and other countries, without solicitation, of eight volumes of the *Doklady Academii Nauk U.S.S.R.*, or *Reports of the Academy of Science, U.S.S.R.* for 1948 and 1949, from Russia. The reports of the Russian Academy cover a very wide field. Publication of papers in it is confined to academicians, other scientists being restricted to four per year, provided they are approved and presented by a member of the Academy. These volumes were posted direct by the Academy and resume the pre-war practice, interrupted by the subsequent 'cold war', of making available Russian scientific and industrial literature through the Russian 'Associations for Cultural Relations' abroad.

Hope for the Best

SCIENTISTS may well wonder what has prompted this silent move in the international poker game. Is it the beginning of a realisation that perhaps not even Russian science can cut itself off completely from its own antecedents and contemporaries and must acknowledge a common parent to the West? Recent violent denunciations of Pauling's theory of resonance as 'representative of world outlooks hostile to the Marxist view' would not seem to demonstrate much support for the common parent theory. Or is it yet another of those unpredictable and inconsistent Russian actions that spring from who knows what secret decisions made behind guarded doors? Or, again, perhaps it is merely a relaxation of official pressure which has allowed the natural interchange of information to resume its normal course. Whatever the reason for their sudden appearance, it is to be hoped that the *Doklady* will continue to be received.

New Carbon Black Plant Uses American Process

UNTIL recently the United Kingdom has been dependent upon the United States for its supplies of carbon black, but the erection of a new plant at Avonmouth, which was recently opened to inspection by the Press, should cover 50 per cent of the United Kingdom's estimated present annual consumption of carbon black. The capacity of the plant, which is owned by Philblack Ltd., is more than 50,000,000 lbs. a year; over 20,000,000 lbs. of 'Philblack A' and more than 30,000,000 lbs. of 'Philblack O.'

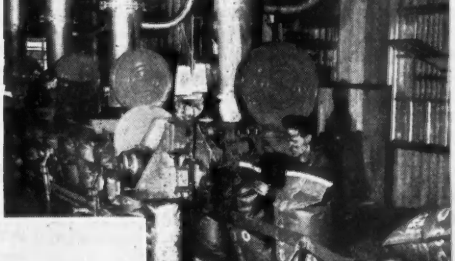
Carbon black is used in the manufacture of inks, paints, lacquers, and hundreds of other commodities, but its chief use is in the rubber industry for reinforcing motor car tyres. 'A' grade is a medium reinforcing grade noted for ease of processing, while 'O' imparts to rubber the highest reinforcing properties.

For fifty years prior to 1943 the raw material used in the manufacture of carbon black was natural gas, but in that year the Phillips Petroleum Co. of America found that the commercial production of a good reinforcing carbon black using a petroleum fraction in a specially designed furnace plant was far more efficient, eliminating a great deal of the waste which was involved in the making of channel black. The efficiency of the latter process using natural gas is only about three per cent, but in the new process an efficiency of more than thirty per cent is obtained. In addition the gaseous products of combustion can be collected and their fuel value utilised.

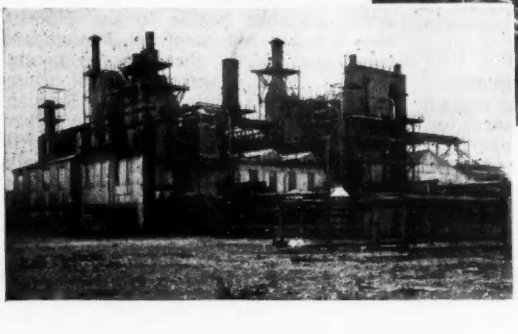
In 1948, Philblack Ltd., a British-owned company, obtained a licence from the Phillips Petroleum Co. for the manufacture of carbon black by the 'Philblack Process.'

MR. BRIAN H. TURPIN, technical and sales director of Quickfit & Quartz, Ltd., of Stone (Staffs.), manufacturers of industrial and laboratory chemical glassware, and a member of the Triplex group of companies, is to visit France and the Low Countries. He will spend a week in Holland, a week in Belgium and a short time in the Paris area, during which he will attend the Chemistry and Industry Congress in the French capital.

Mr. Turpin will visit the exhibition of laboratory and scientific equipment and contact his firm's principal clients in France, Belgium and Holland.



Right: The packing department is equipped with modern labour and time saving devices



Left: A general view of Philblacks' new plant at Avonmouth

Scientific & Industrial Research

International Symposium Held in London

ELEVEN countries besides Great Britain were represented by their leading scientists at an International Symposium on the Organisation of Scientific and Industrial Research which was held at Lancaster House, London, this week (12-15 November).

Intra-European Mission 81, one of many technical assistance projects organised in recent years by the Organisation for European Economic Co-operation, has been touring eight European countries to study the organisation of research and its methods of application to industry. The mission is now concluding its tour with a visit to industrial and Government research laboratories in Great Britain; and this seemed a suitable opportunity to invite the heads of national organisations controlling or encouraging research to meet and discuss ideas and problems.

The symposium was intended to afford these senior scientists an opportunity for reviewing and discussing the observations of the mission and of considering how some of the more successful methods of doing research and having it applied can be adopted in their own countries.

It is hoped as a result of the discussion that levels of industrial efficiency and prosperity will be raised throughout Western Europe. Emphasis throughout was on the application of research results rather than on research itself.

Lord Woolton Welcomes Delegates

Welcoming the delegates Lord Woolton, the Lord President of the Council, said it was a pleasure to him that his first official function since taking office should be to welcome so many eminent scientists from other countries to the United Kingdom and to meet distinguished representatives of this branch of learning from his own country.

The symposium was an important and promising occasion. It was well known that science is essentially international in its development and scope, and that scientists as a whole are internationally minded. Never before had the responsible leaders of industrial research of Western Europe gathered together and never before had there been such a condition of harmony for the establishment of real and constructive collaboration between them for the general improvement of European economy and the standard of living of the people of Western Europe. The stream of scientific developments was fed from many sources, from many countries and from many schools of research; all made their contributions to a general advancement of knowledge which gave possibilities for new ventures in industry and new applications in medicine and agriculture.

Science itself, however, would not be the subjects of the symposium but rather how applied research could best be organised to serve industry. This was a problem of importance to all countries in view of the need to improve general industrial efficiency. This was, indeed, a thoroughly practical job with obvious economic consequences.

Fundamental Science Vital

Of all the factors which influence industrial well-being, whether political, fiscal, sociological, economic or scientific, fundamental science was likely to have the greatest effect in the long run. A discovery made in a university laboratory might well, within a decade or two, give rise to a great new industry throughout the world or might revolutionise the practice of an industry already well-established.

No country had a monopoly in scientific discovery but each country had a need to ensure that conditions favourable to fundamental research were provided. For this reason the policy of the British Government in regard to fundamental science was to support it by financial and other means and to leave it to develop freely. Such co-ordination as it required was best supplied by the scientists themselves.

With applied research and development, however, circumstances were very different. Team work was as necessary as individual invention and research between different groups of people—the engineer, the scientist and the economist—consequently, co-operation in this field could lead to saving of manpower and money. Industry itself must take the brunt of applied research and development, but in this country it had been

well established policy for the last 35 years through the system of industrial Research Associations, to undertake a considerable proportion of applied research as a joint enterprise between Government and industry.

It was in this field of applied science so costly to each country, but which no nation determined to maintain its place in the forefront of development could neglect, that co-operation became desirable between nations. Here the initiative of the OEEC had been most effective and indeed, it ranked high among the promising approaches to international co-operation. Western Europe was at a disadvantage as compared with large countries such as the United States or Russia in that it was divided into small political units.

Uniform Pilot Plants

In the United States, for example, when a great and costly industrial development was to be undertaken, it was not necessary to duplicate pilot plant or the engineering of the prototype machines in States as widely separated as Massachusetts, Texas and California. Political unity over a vast geographical region ensured that a single experiment could serve the needs of the whole area while in Europe the same problems must be separately tackled by all the highly industrialised countries.

There were a number of topics, particularly those connected with the exploitation of natural resources, which were suited to co-operative research by several countries. The OEEC Scientific and Technical Committee had worked out a valuable procedure of co-operation which allowed those countries especially concerned in a particular project to work together without involving other countries.

An important example of this was the low-shaft blast furnace experiment; although an expensive enterprise it had, nevertheless, attracted the co-operation of a number of countries whose interest was shown by their willingness to provide money and men for it. This flexible system of arranging co-operation topic by topic was more likely to be successful in the applied field than construction of international laboratories.

Fuel problems figured prominently among the topics being considered by the OEEC for co-operative work. This was a proper emphasis because of the fundamental importance of fuel in all European economy, and because of the great advance which science is expected to yield in this field of scientific endeavour. Total gasification of solid fuels and the underground gasification of coal were both subjects which demanded investigation by most countries and which would require costly, large-scale investigation if their economic utility was to be tested.

Many raw materials problems were similarly of common interest. A particularly useful one was that of how phosphate fertilisers could be made with less or even with no sulphuric acid, in view of the present and anticipated continuance of the scarcity of sulphur. In this chemists, engineers, economists and agricultural experts were co-operating and it was hoped that it would soon be possible to produce fertilisers by varying means suited to the different circumstances of the participating countries.

Lord Woolton concluded by saying that he was glad to know that the U.S.A. and Canada as associate members of the OEEC were taking part in these deliberations and that they should have contributed to the healthy and complete understanding which had been established among the Western European countries in this subject and he was much encouraged to learn that observers from the other countries of the British Commonwealth would take part in this symposium. According to the constitution of OEEC they could not become members of the committee. Nevertheless, they represented a considerable part of the research and development potential of the free world and it was to be hoped that some means might be found of ensuring their participation on particular topics on which co-operation might be decided upon.

Scientists' Responsibility

The world had great need of the help of the scientists. Their knowledge and skill had, during the last 50 years, placed powers of incalculable proportions in the hands of humanity. They had placed in the frail hands of men some powers that could quicken life, some that could enlarge its boundaries and others that could within a few moments destroy all for which humanity had struggled for years.

Science had made it possible for more people to live and to live longer. Now it was called upon to enable them to live more abundantly. Remarking that, as some of the delegates might know, 'we have recently had

a change of Government in this country,' Lord Woolton begged leave of the assembly to be excused as he had to attend a Cabinet meeting, and the chair was taken by Dr. A. King, head of the Intelligence Division, DSIR.

Dr. King said that the choice of a chairman at such a gathering was rather an invidious matter, and it had therefore been decided to ask various delegates to preside. M. de Lombares, inspector general of Technical Research, France, would take the chair at the second session, Dr. Joachim Pretsch, counsellor in chief to the Federal Ministry of Economic Affairs, Germany, at the third, and Professor Edy Velander, director of the Swedish Academy of Engineering Science at the fourth, while Dr. Hugo Kruyt, president of the Central National Council for Applied Scientific Research in the Netherlands had been asked to preside at the final session and sum up the discussions.

An introductory address on 'Industrial Research and its Application' was then given by Sir Ben Lockspeiser, secretary of the DSIR, who said that the symposium was being held at a critical moment in history, and an anxious future lay ahead. The meeting was opportune because its decisions might well help to settle the part which science and technology would play in shaping that future. The symposium had been arranged primarily to enable all European countries to draw on one another's experience in the organisation of applied research. Nevertheless the importance of fundamental research should be borne in mind, for without it many striking advances and revolutionary industrial innovations would be impossible.

Europe's Proud Record

The European countries, as America was the first to admit, had a long and proud record in fundamental research and scientific discovery, and it would be foolish to allow this capital account to run down.

While fundamental research did not require organising it was essential that applied research should be. In Great Britain there were three main research bodies, medical, agricultural, and the DSIR undertaking research in different fields. Standards of research for manufacturing industries were bound to vary, the structure of an industry must determine to a large extent the organisational pattern of its research. Small firms played a vital but distinctive part. In this country nearly three-quarters of the firms in the manufacturing industries employed fewer than 100 people, and of these more than half employed less than 25 people.

In the U.S.A. large firms with large financial resources carried out the greater part of the applied research. In addition research institutions had grown up which undertook sponsored research on a confidential and frequently non-profit-making basis. In Canada there was a different pattern again. There were a relatively few large firms, industries were separated by long distances and to meet these conditions a very flexible system of Government research had emerged under the National Research Council.

Whatever the pattern followed, the main problem was to bring science to firms which did not undertake it themselves. Even if it were possible for all firms which wished to carry out their own investigation, then no country would have an adequate supply of scientists.

Extended Co-operation Urged

It was essential that the Western European countries should wrench themselves free from their national prisons for the basic trend in technology favoured large markets. The possibility of extending co-operation between countries as well as firms was a subject in which the OEEC was at present a pioneer.

Applied research was the first link in a chain of events which had their origins in the laboratory and ended in the market place. Research, however good it might be, and whatever promise it might hold, was not likely to come to much unless each link of the chain could be forged in turn. Achievements in the laboratory required translation into manufacturing terms and this was seldom straightforward and rarely easy to achieve.

Value of what came out of applied research depended to a large extent upon the choice of problems, and there was a strong case for greater attention to the selection of objectives in terms of economic significance. Good science was not always good business. Scientific resources were limited and it was better to concentrate on a few problems the solutions of which were likely to benefit industry, than to spread resources thinly over a wider field. Much closer integration of

physical science with economic thought was necessary.

Operational research involved a systematic study of all the factors which affected productivity, types of machines, lay-out, efficiency of industrial processes, handling and transport of work within the factory and the balance of operations as a whole.

It was sometimes queried whether greater productivity and other industrial problems were any concern of the scientist. There should, however, be no doubt on the matter, it was definitely part of the business of the scientist to relate human endeavour to economic and social advantages. Operational research was no substitute for laboratory research but complementary to it for it showed where science was most needed and the conditions under which it could be best applied. It would be a good thing if a certain percentage of scientists could leave their laboratories and take the powerful techniques of science and the scientific method to the actual happenings inside industry.

Administrative Tolerance Necessary

Organisation and administration were important, but should be carefully applied. A good scientist was curious and inquisitive and should not only be free but feel himself free to challenge authority and accepted ideas. A cramping administration which did not know tolerance and failed to take advantage of the unexpected would take the heart out of science.

Professor Eligio Perucca, director of the Turin Polytechnique School, Italy, then gave a brief summary of his impressions of Intra-European Mission No. 81. The mission, said the professor, consisted of 25 members representing 11 European countries, and it had visited Belgium, Denmark, France, Germany, Italy, the Netherlands, and Sweden, and was now in its concluding stages in a tour of Great Britain. It was far too soon to be able to express any definite opinion, the mission had not had time to correlate its impressions, while it also felt valuable results would be obtained from the symposium.

There had been an appreciable growth of national research organisations which was significant of the increasing appreciation of the need for better application of science in industry. Another matter which was being considered was the possible establishment in Europe of sponsored research institutions of the type existing in the U.S.A.

It was not possible, declared Professor Perucca, to lay down any general formula for research or its application. Organisation was bound to vary in different countries due to economic and political structure, nevertheless, he believed that closer co-operation was possible and this could mainly be achieved by affording the people engaged in research in different countries more opportunity of getting together.

The chairman then declared the meeting open for discussion.

Dr. Hugo Kruyt, president of the Central National Council for Applied Scientific Research in the Netherlands, was the first speaker. He expressed the thanks of all the representatives for the opportunity to hear about the tour of Mission No. 81 and its impressions, although he appreciated that at the present stage these must remain of a general nature and it was therefore rather difficult to open a discussion which was bound by circumstances to remain slightly indefinite.

It seemed highly unlikely, he agreed, that it would ever be possible to attain a general scheme for the organisation of scientific research which would be applicable to every country—for individual systems would always be more or less different. Nevertheless, the tour had shown the value of personal contacts, and how some researches which were too expensive for one individual country could be made possible if undertaken by united effort.

The Human Approach

M. Delbart, director of the French Iron and Steel Research Institute, spoke next. He also emphasised that one of the main achievements of the mission had been to show the value of human approach as an encouragement to attainment of international co-operation. Initiative which started with one man, might well be developed between countries; an example given by an earlier speaker was that of the low-shaft blast furnaces in which seven countries had participated.

An interesting point was then raised by M. Charles Igonet, head of the central division directorate of technical services, OEEC, who cited the case of a certain relatively small manufacturer who might wish to increase his knowledge, while having little scientific basis

on which to start. To whom should he turn? Co-operative research generally preferred a more general interest. It had therefore been decided to try out within the OEEC a system of liaison whereby the small manufacturer could apply to a national centre, which would consider his query and could then direct the inquirer to some other country likely to be interested or able to afford the necessary information.

Financial considerations were vitally important to the successful organisation of scientific and industrial research, it was pointed out by Dr. F. Gummert, treasurer of the endowment committee for German science. Europe contained no lack of brain power, he said, but more money was essential, particularly to Germany.

Mr. E. F. Mactaggert, of the Sondes Place Research Institute and a member of the U.K. delegation, who followed, said that he was pleased that this problem of money had been raised. Any attempt to organise and apply research must ultimately be founded on a sound financial basis. This meant an investigation into the relative expenditure on research in different countries must be considered, and the implications of costs per head per research worker appreciated.

M. Louis Henry, director of the Institute for the Promotion of Scientific Research in Industry and Agriculture, Belgium, emphasised the need for leaving each country its own organisation and Dr. Joachim Pretsch, counsellor in chief to the Federal Ministry of Economic Affairs, Germany, advocated what he described as 'a more adequate interlock' between research associations, professional unions and scientific societies.

Opinions Valuable

Summing up, Dr. A. King, the chairman, said that although the discussion had of necessity been general, a number of interesting points had been raised; that resolutions were not expected from the symposium, but its opinions would no doubt have some influence on the final report of the mission. It should be borne in mind that the mission, like all those organised by the OEEC, was not under any influence of Government or country, it was at liberty to express its own views and make recommendations, and he had not the slightest doubt that Mission 81 would maintain a healthy independence of attitude. The question of finance was undoubtedly one that deserved serious attention. Were adequate funds available, and if so, what were the discrepancies in their proper application? While it was appreciated that each country must develop according to its needs, history and background, nevertheless co-operation could be achieved between countries in many ways. Personal contact was undoubtedly a big influence, and it was to be hoped that some helpful conclusions would be reached during the present symposium.

German Research

Among the papers presented at the second session was one on the 'Advancement of Research for Industrial Purposes in the German Federal Republic' by Dr. J. Pretsch, counsellor in chief to the Federal Ministry of Economic Affairs. After describing the advancement of research for industrial purposes up to 1945 the doctor went on to explain the rebuilding of scientific endeavour. In February, 1948, the Max Planck Society was formed for economic research consisting of 26 institutions, which had now grown to 33 in number. These included institutes for research in physical chemistry, chemistry, metals, iron, silicates, coal, biochemistry, bio-physics, bast fibre and the Institute of Ionospheric Research, a research station for albumens and leather and an Instruments Research station. Work was carried on independently of State influence and irrespective of industrial or university connections.

While the Max Planck Society carried out research work itself within the framework of science in general, the Notgemeinschaft (Emergency Council of German Science) had for its main purpose the alleviation of the present difficult situation by granting personal support to research workers. Founded originally in 1920, it was reformed in 1949 and continued until August this year when it was combined with the German Research Council to form the German Research Association (Die Deutsche Forschungs-gemeinschaft). It was too early yet to state whether the new association would devote itself to increasing the speed of progress in research work for industrial purposes.

Both the Max Planck Society and the Emergency Council (Notgemeinschaft) dealt chiefly with research in the interests of pure science, and research for economic purposes took second place; there was thus no institution for the express purpose of specially

encouraging industrial research. Even in scientific circles this was a lack which was openly recognised. The Fraunhofer Society for the Advancement of Applied Research was therefore founded at Munich in March, 1949, for the express purpose of 'providing means and possibilities of extended research on natural science and technique for the benefit of industry'. A direct connection was thus formed between science and industry, as seen in the formation of the governing body, which consisted of an equal number of scientists and industrialists.

The doctor then went on to explain the measures taken by the State and by the Provincial Governments to encourage industrial research.

Aid for Inventors

Measures to help the independent inventor were also considered to be urgently necessary, but the only encouragement so far offered by the Federal Government was in the form of an income tax rebate, which was granted if the invention was 'of value to the national economy'. Discussions were still proceeding on the form to be taken by help other than a tax rebate; the line so far adopted was to copy the British model of the National Research Development Corporation, industrial and research circles were engaged in discussion on starting a totally new type of institution suited to German conditions, perhaps on the lines of the American non-profit research foundation, in which scientists and engineers of the most diverse branches of industry could work out research projects in common. This would have to be a community undertaking and not a commercial firm and would have no grant in aid from the State.

'The Co-operative Industrial Research Associations in the United Kingdom under the Department of Scientific and Industrial Research Scheme' were the subject of a paper by C. A. Spencer, C.B.E., head of the Industrial Grants Division, DSIR.

After a brief historical survey showing the growth of the research associations and their increasing contribution to industrial efficiency in the U.K., the speaker went on to give the definition of a co-operative research association, its formation and constitution, revenue and special grants, and the functions of the industrial grants committee.

Contributions of member firms were made on a basis proportionate to their size. While foreign firms operating in foreign countries were not eligible for membership, firms under foreign control could be accepted, provided that they were manufacturing in the U.K., undertook not to disclose confidential information to their foreign associates, and that the association would benefit from their membership technically as well as financially.

Results of researches carried out by any association belonged to it and were available to all members. The Government was, however, bound to safeguard national interests where new discoveries were made with the assistance of Parliamentary funds and accordingly it reserved the right of veto in case any proposal was made by a research association to communicate any results of research to a foreign power or to a foreign corporation, and the right, after consultation with the council of the association concerned, of communicating the results of discoveries to other industries for their use on suitable terms.

The problem of how the results of research could most effectively be communicated to industry was one which was receiving constant attention both by DSIR and by the research associations.

Functions of the Associations

It was difficult to generalise on the functions of 42 different associations covering a wide range of industry but broadly the work done fell into the following categories:—

(a) fundamental research on the raw materials and processes of the industry;

(b) applied research on urgent technical problems of general concern to the industry. This was usually the largest class of work;

(c) the development of research results to the semi-scale or pilot plant stage either in the laboratories of the research association or in the works of member firms;

(d) qualitative, operational and statistical surveys of industrial processes in member firms with a view to increasing efficiency;

(e) library and information services covering scientific and technical data and developments in the industry at home and overseas;

(f) external liaison services and a limited amount of *ad hoc* investigations and testing.

Reports of later sessions of the symposium and the general conclusions of the conference will appear in the next issue of THE CHEMICAL AGE.

Sulphur Committee Releases Details of World Shortage

THE Sulphur Committee of the International Materials Conference on Monday released figures showing, for the first time, the total free world production and consumption of sulphur for the period 1948-49-50, and estimates for 1951-52. This compilation was made possible through the information received in replies to the questionnaires which the committee had sent out to all interested governments in connection with the committee's work on third and fourth quarter 1951 allocations.

The information given in the attached tables confirms the committee's earlier view that in 1951 world requirements of sulphur, both crude and refined, amount to approximately 7,134,200 long tons, whereas it is expected that production will amount to 5,862,300 tons, leaving a shortage of 1,271,900 tons; and that in 1952 the requirements are estimated at 7,596,300 tons while production foreseen is 6,255,600 tons, leaving a shortage of 1,340,700 tons.

Increase Due to Expansion

Since 1949, the demand for sulphur, as such, has increased by 32 per cent in 1951, and 40 per cent in 1952. This increase is due to the expansion in the uses of sulphuric acid, sulphur dioxide, carbon bisulphide, and in agriculture and in other industries. Table I gives the breakdown of the demand by tonnages and indicates the predominance of sulphuric acid as a consumer of sulphur.

The increased demand for sulphur for certain important uses in 1951 and 1952 over 1949 is shown in Table II.

The importance of sulphuric acid as a key industrial chemical is shown by the analysis of uses of sulphuric acid in Table III. Table IV shows the quantities and the relative percentages of the principal raw materials used in making sulphuric acid during 1949 and 1950 and estimates for 1951 and 1952.

Pyrites Requirements

World requirements of pyrites in 1951 amount to approximately 4,451,000 long tons whereas it is expected that production will amount to 4,395,300 tons leaving a shortage of 56,100 tons (sulphur content in each case); in 1952 the requirements are estimated at 5,000,300 tons while anticipated production is 4,745,500 tons, leaving a shortage of 254,800 tons.

Total free-world production and consumption of sulphur and sulphur-containing raw materials from all sources in terms of sulphur content for the years 1948-1950, and estimates for the years 1951 and 1952, are shown in Tables V and VI.

In the light of these statistics the seriousness of the sulphur shortage is apparent. The United States representative stated to the Committee that the recent announcement in the press concerning the discovery of a new sulphur dome in the State of Louisiana does not relieve the pressure for a vigorous prosecution of the various recommendations of the Sulphur Committee for the conservation of sulphur and the full expansion of all possible sources of production. It is anticipated that some of the production from the new Louisiana discovery, which is not expected to produce until late in 1953, will in fact be partially offset by declining output, expected over the next few years, in several of the mines now producing.

TABLE I—CONSUMPTION* AND USES OF SULPHUR AS SUCH
(in 1,000 long tons)

	1949	Percentage of Total	1950	Percentage of Total	Est. 1951	Percentage of Total	Est. 1952	Percentage of Total
Sulphuric acid ..	3539.1	65.3	3989.8	63.0	4409.8	61.8	4573.2	60.2
Sulphur dioxide ..	731.7	13.5	887.8	14.0	1022.6	14.3	1131.0	14.9
Carbon bisulphide ..	377.4	7.0	515.6	8.2	611.8	8.6	669.7	8.8
Special agricultural uses	409.8	7.5	419.8	6.6	502.9	7.1	513.8	6.8
Other uses	361.4	6.7	516.0	8.2	587.1	8.2	708.6	9.3
Total	5419.4	100.0	6329.0	100.0	7134.2	100.0	7596.3	100.0

* 1951 and 1952 represent estimated requirements.

TABLE II—INCREASE IN USE OF SULPHUR AS SUCH*

Use	Percentage Increase of 1951 over 1949 Consumption	Percentage Increase of 1952 over 1949 Consumption	Principal End Use
Sulphuric acid	24.6	29.2	Analysis in table below.
Sulphur dioxide	39.8	54.6	Wood pulp.
Carbon bisulphide	62.1	77.5	Viscose.
Special agricultural uses	22.7	25.4	Dusts, insecticides, etc.
Other	62.5	96.1	Rubber, dyestuffs, explosives, etc.
Total	31.6	40.2	All uses.

* Based on figures contained in Table I.

TABLE III—USES OF SULPHURIC ACID (FROM ALL SOURCES)
(1,000 long tons of 100 per cent Acid)

	1949	Percentage of Total	1950	Percentage of Total	Est. 1951	Percentage of Total	Est. 1952	Percentage of Total
Superphosphate ..	8367.8	40.0	8709.4	36.7	9627.6	36.2	10,472.2	36.4
Ammonium sulphate ..	3547.4	16.9	4263.7	18.0	4734.7	17.8	5020.8	17.5
Textiles	1442.8	6.9	1808.7	7.6	2102.5	7.9	2320.2	8.1
Dyestuffs	257.0	1.2	351.1	1.5	416.3	1.6	496.2	1.7
Metallurgical uses ..	1157.9	5.5	1355.4	5.7	1486.4	5.6	1651.5	5.7
Other	6181.1	29.5	7243.4	30.5	8211.6	30.9	8787.8	30.6
Total ..	20,954.0	100.0	23,731.7	100.0	26,579.1	100.0	28,748.7	100.0

TABLE IV—RAW MATERIALS FOR SULPHURIC ACID
(1,000 long tons of Sulphur Content)

	1948	Percentage of Total	1949	Percentage of Total	1950	Percentage of Total	Est. 1951	Percentage of Total	Est. 1952	Percentage of Total
Sulphur as such	3335.2	46.3	3539.1	46.4	3989.8	46.2	4409.8	45.7	4573.2	43.7
Pyrites	3024.0	41.9	3181.9	41.7	3577.4	41.5	4082.4	42.3	4616.1	44.2
Zinc-blende ..	515.1	7.1	529.3	6.9	647.7	7.5	699.4	7.2	765.2	7.3
Spent oxide ..	119.3	1.7	137.0	1.8	161.6	1.9	196.1	2.0	218.6	2.1
Anhydrite and other ..	217.1	3.0	240.3	3.2	251.0	2.9	270.9	2.8	280.5	2.7
Total ..	7210.7	100.0	7627.6	100.0	8627.5	100.0	9658.6	100.0	10,453.6	100.0

TABLE V—PRODUCTION OF SULPHUR AND SULPHUR-CONTAINING RAW MATERIALS
(1,000 long tons of Sulphur Content)

Materials	1948	1949	1950	Est. 1951	Est. 1952
Native sulphur	5120.1	5046.7	5563.7	5422.7	5699.8
Recovered sulphur	224.3	233.8	350.7	439.6	555.8
Pyrites	3425.0	3898.4	4164.7	4395.3	4745.5
Sulphur in all other forms	977.0	1022.5	1163.8	1265.8	1366.4
Total	9746.4	10,201.4	11,242.9	11,523.4	12,367.5

TABLE VI—CONSUMPTION OF SULPHUR IN ALL ITS FORMS
(1,000 long tons of Sulphur Content)

Materials	1948	1949	1950	Est. 1951	Est. 1952
Sulphur as such	5418.1	5419.4	6329.0	7134.2	7596.3
Pyrites	3237.4	3546.8	3924.0	4451.4	5000.3
All other	1081.1	1111.0	1274.8	1389.7	1522.9
Total	9736.6	10,077.2	11,527.8	12,975.3	14,119.5

New Electronic Analyser

TWO graduate students in the University of California's department of chemistry have developed a new electronic analyser capable of doing several years' chemistry work in a few weeks, it is claimed. The new instrument, designed and built by the students, is a 'continuous flow recording ultraviolet spectrophotometer' which can analyse any solution capable of absorbing ultraviolet light. Along with this analysis, the machine can also determine purity of substances in a solution and separate out pure fractions, or parts of the solution. The instrument can continuously record absorption at four pre-set ultraviolet wavelengths. The only instrument of its type in the world, most of the work done with it so far has been on nucleic acid derivatives. Briefly, the solution passes over an ion-exchange resin followed by a dilute wash which passes through the spectrophotometer. The absorption volumes are tape-recorded and the solution flows into a collecting bottle, either separately or with other substances.

The Mechanism of Solids Drying

Adsorption Phenomena in Drying Clays

DRYING characteristics of china clay were the subject of a paper presented by Professor D. M. Newitt, M.C., D.Sc., F.R.S., and M. Coleman, B.Sc., at a meeting of the Institution of Chemical Engineers held at Burlington House, London, on 6 November. The paper was the third in a series of addresses being given by the authors on 'The Mechanism of Solids Drying'. The following is an abstract of the paper:—

When a plastic clay-water mix is permitted to dry, it passes through certain volume changes. From the initial moisture content down to a point L, the volume of shrinkage is exactly equal to the volume of water evaporated off. After point L, which is termed the 'leather-hard' stage, any further reduction in moisture content produces little or no volume change, right down to dryness.

The generally accepted explanation of this behaviour is that at moisture contents higher than at point L, the clay particles are separated from one another by water films, which, as desiccation proceeds, are reduced in thickness and permit the closer approach of particles to one another. When the moisture content at L is reached, the particles have all come into contact with one another and further shrinkage is not possible. Beyond this stage, therefore, water removed must be replaced in the pores by air.

Moisture Content

It has been found by several investigators that the leather-hard moisture content and the critical moisture content of a clay body are usually nearly coincident. Hence, the constant-rate-of-drying period is associated with the removal of shrinkage water, while the falling-rate-of-drying period is associated with the removal of the pore water. By the previously held theory postulating a capillary mechanism, however, there is no adequate reason why at least a little of the pore water could not be fed to the surface and so prolong the constant-rate period.

Little attention has been paid before to the rôle of an adsorbed water phase in the explanation of drying mechanisms. The existence of a more or less immobile liquid layer adjacent to a solid surface has long been recognised in fluid flow and heat transfer studies. Water in very fine-pored systems exhibits no freezing expansion even when cooled down to −70°C., suggesting the presence of a phase different from that of normal bulk water. An accepted interpretation of this phase difference is that strong intermolecular attractive forces compress the water at the solid surface into a dense, molecularly orientated form of abnormally high viscosity. It is this attraction at the interface which releases energy in the form of heat when a surface is wetted, and on the basis of this heat of wetting, the compressive force of adsorption for certain solid/liquid systems has been estimated to be many thousands of atmospheres.

Vapour Pressure Lowered

A further consequence of adsorption attraction is the lowering of the vapour pressure of adsorbed water below that of bulk water, the extent of the lowering being thermodynamically consistent with the decrease in free energy accompanying the wetting process. A curve showing the variation in equilibrium moisture content of a material with humidity (*i.e.*, partial vapour pressure) of the atmosphere at a particular temperature is, in fact, an adsorption isotherm. Its continuous nature, in contrast to the stepped vapour pressure curves of salt hydrates, is ascribed to successive layers of water further removed from the solid surface being less and less strongly adsorbed and suffering, therefore, less and less lowering of vapour pressure. Eventually a moisture content is reached such that the outermost layer of water possesses the full vapour pressure of normal bulk water. All water removed during a constant-rate period must be of this type.

Briefly then, the modified characteristics of water in the adsorbed phase are:—

(1) Increase in viscosity, possibly to the extent of immobility.

(2) Decrease in vapour pressure.

The distinction should here be made between adsorbed water films and the osmotically imbibed water films which account

for the plasticity of clays. These films, while they are much thicker, are very much less strongly held and suffer no vapour pressure reduction, the mechanism of attraction being entirely different. Osmotic imbibition requires the presence of a surface which can dissociate diffusible ions and is therefore confined to a certain class of solids such as clays; adsorption, on the other hand, is dependent only upon an inter-molecular attraction between solid and liquid and is common to all solids which wet. Adsorbed films can, however, like osmotically imbibed films, be responsible for swelling and shrinkage and even for plasticity, but to a very much smaller degree, and only if the solid particles are so small that the film thickness becomes appreciable in comparison.

These concepts of an adsorbed phase will now be used to propose a mechanism for moisture removal during both first and second falling-rate periods which will satisfy all the observed phenomena.

Rate of Vaporisation

A primary assumption in the proposed mechanism is that moisture movement during the falling-rate periods is in the form of vapour flow to the surface. This is well substantiated by experimental evidence. The rate of vaporisation at any point in the porous structure is controlled by two factors:

(1) The difference of the vapour pressure of the moisture at that point from that of the moisture in the drying air.

(2) The total resistance (R) to vapour flow from the point under consideration to the air stream. This is made up of the resistance caused by the network of minute passages in the clay and that offered by the surface gas film. The first depends on the length of path and its width, which in turn is governed by moisture content.

In a drying bed of clay just entering the falling-rate period, the particles are in complete contact and all pores are filled with water. Vaporisation of this water begins at the surface and extends inwards as passageways are opened, eventually extending to the entire depth of the bed. The moisture loss is more rapid near the surface because of the smaller total resistances to vapour flow resulting from the shorter paths of flow and the larger channels associated with lower moisture contents. This tendency is checked by the progressive lowering of the vapour pressure accompanying the decrease in moisture contents, until eventually an equilibrium state is reached when vaporisation is no more rapid at one part of the bed than at another. A sudden decrease in moisture content at any point will be checked by a corresponding decrease in vapour pressure.

The resistance of the surface gas film must be included in the total resistance, R, because over a considerable range of average moisture contents within the second falling-rate period the surface possesses an appreciable moisture content. If the resistance to vapour flow from the solid surface to the main body of the air stream were negligibly small, the surface would become dry immediately after liquid flow had stopped, *i.e.*, immediately after the critical moisture content. Some materials do exhibit such behaviour because of their high internal resistance to vapour flow.

When the aforegoing is applied to an interpretation of the form of rate-of-drying curves, the causes of the falling-off in drying rates after the leather-hard moisture content are: (i) the immobility of the remaining moisture which obliges it to vaporise *in situ*; (ii) the progressively decreasing vapour pressure of the remaining moisture; (iii) resistance to vapour flow through the fine-pored structure of the body, added to that through the surface gas film.

Falling-Rate Periods

During the first falling-rate period the layers nearer to the surface contribute more to the overall moisture loss; when this condition is succeeded by one of equal moisture contribution at all depths, a steeper fall-off in drying-rate is to be expected. Why the rate-curve in this period should be linear is not clear, and there is in fact no evidence that it is entirely so.

During the second falling-rate period the form of the rate-curve is mainly influenced by the decrease of vapour pressure with decrease of moisture contents, *i.e.*, the rate of drying at any average moisture content is proportional to the 'average' driving force at that moisture content. However, the resistance term does not remain constant, but decreases with decreasing moisture contents because of the increased cross-sectional areas of the channels available for vapour flow, so that this factor will also influence to some extent the form of the curve.

Fertilisers in Eastern Germany

Difficulties Evident in Phosphate Production

MOST of the fertiliser production of East Germany is in the hands of the SAG (Soviet Akt Ges), among which are some of the largest ex-German factories, such as the Leuna works of the former I.G. As one of the SAG, these works are assured preferential treatment (as compared with non-SAG) in the matter of equipment and labour. Ammonia output in terms of nitrogen increased from 50,600 tons in 1945-6 to 227,400 tons in 1949-50. Most of this ammonia is used for fertilisers and other nitrogen products and very little is sold as such. Similar progress has been made since 1945-6 at the Bayer Piesteritz works, but its output is much smaller than Leuna, for in 1949-50 (*i.e.*, the year ending 31 May, 1950) it was only 20,000 tons of nitrogen, while the Leuna share for that year was 121,700 tons out of the grand total stated above. For the remainder of 1950 (1 June to 31 December) the total was 132,200 tons of nitrogen, of which the Leuna share was 77,000 tons, Bitterfeld 34,000 tons, and Piesteritz 12,800 tons. Leuna exports from 1 June, 1949, to 31 December, 1950, were 46,200 tons nitrogen. Production at these works is almost entirely ammonium sulphate; while at Bitterfeld, Piesteritz, Wolfen, etc., it is sodium nitrate, calcium-ammonium nitrate, nitro-lime, etc. Plant for these at Leuna has been dismantled. As compared with pre-war conditions, therefore, the percentage share of ammonium sulphate in the total nitrogen produced has risen from 23 per cent to 57 per cent. This is considered very unfavourable to the proper balance of fertilisers for agriculture.

Chief Superphosphate Works

Phosphates: The five principal superphosphate works in the Soviet zone are Coswig, Salzwedel, Magdeburg, Südost, Oschersleben, and Draschuritz Reuden. Their total capacity is said to be 35,600 tons P_2O_5, but owing to lack of raw materials (crude phosphate and sulphuric acid) actual output in 1949-50 was only about half this; though there was some improvement in the second half of 1950 (13,000 tons). Up till 1947-48 about 60 per cent of the raw phosphate came from French North Africa; but since then supplies have been chiefly from Russia —about 60,000 tons in 1949-50. Small quantities of Thomas phosphate are produced at Unterwellenborn (4,000-5,000 tons) and some potassium phosphate at Heinrichshall.

Calcined Phosphate Plant

In order to have a substantial increase in phosphate production, under the two-year plan ending 1950, three plants for calcined phosphate have been or are being constructed, where sulphuric acid will not be required. The first, at Heinrichshall, started up in April, 1949. Some of the product is sold as potassium phosphate, but output generally is below the planned figures, and the farmers are disappointed. The second calcined phosphate plant at Rüdersdorf, near Berlin, with a capacity of 16,000 tons P_2O_5 is now working, but not yet to anywhere near full capacity. The site of the third one had not even been settled at the date of this report (about July, 1951). It has been necessary therefore to import large quantities under various trade agreements, especially from Holland, and to a certain extent from Belgium and the U.S.A., some also from West Germany. Total imports in 1949-50 at 68,100 tons P_2O_5 far exceeded home production.

Potash fertilisers: Potash plants are in two main groups—those owned more or less by private enterprise, or native German companies, such as those at Aschersleben, Klein-Schierstedt, Krügershall, Rossleben, Solvayhall, Stassfurt, Beendorf, and Glückauf-Sonderschausen, with a total output in the last two years of about 300,000 tons per annum; and the SAG group, with works at Bleicherode, Sachsen-Weimer, Sollstedt, Bismarkshall, Volkenroda, Kaiseroda, and Heilgenroda—all in Thuringia—with a total output in the last year or two of 800,000 tons. Of a total production of 1,100,000 tons, two-thirds was exported (778,100 tons in 1949-50).

Lime fertilisers: There are about 50 plants in the Soviet zone, mostly of small capacity, engaged in making various types of lime fertiliser. In German they call them Kalkwerke Düngekalk, to which possibly the

nearest approach in English is lime fertilisers works. They are mostly in Sachsen-Anhalt, Sachsen, and Thuringia. Total output has increased from 40,000 tons CaO in 1945-46, to 580,000 tons CaO in 1949-50. Up to about 1948 about one-third of the total was carbonate of lime or a form of calcareous marl (Kalkmergel), and the other two-thirds were burnt lime and miscellaneous lime mixtures. Later the relative percentages changed somewhat.

Fertiliser Distribution: The various pre-war syndicates having been dissolved, distribution was handed over to the newly appointed Deutsche Düngerzentrale (1 June, 1946) working in conjunction with the Land and Forest Ministries. From 1950-51, however, such controlled distribution has only applied to nitrogen and phosphates, and trade in potash and lime has been more or less free. Supplies of nitrogen and potash appear to approximate to pre-war conditions, but the position with regard to phosphates remains very unsatisfactory, and at present can only be improved by largely increased imports. Agricultural lime, too, is in low supply compared with pre-war. The NPK balance (1/1/1.75) is therefore fairly well maintained except in regard to phosphorus which at present is only about half what it should be (0.51).

(*Editor's Note*: *This article is taken from* '*Chem. Industrie*,' *August, 1951, pp. 481-483.*)

Unrestricted Import Cuts

Open Licences Revoked

FOLLOWING the speech by the Chancellor of the Exchequer in the House of Commons on 7 November, amendments to the Open General Licence referred to in Appendices II and III of Notice to Importers No. 485 were announced by the Board of Trade last week. As from 8 November, 1951, licences are necessary for imports of certain commodities originating in and consigned from countries other than the Scheduled Territories (which at present comprise the British Commonwealth (except Canada), British Trust Territories, British Protectorates and Protected States, Burma, the Irish Republic, Iraq, Iceland and Jordan).

Goods in transit which are shown to the satisfaction of the Commissioners of Customs and Excise to have been en route before 8 November, 1951, will be admitted without an import licence.

Separate notices are being issued in respect of the procedure to be followed in applying for import licences.

Appendix II includes the following alterations:—

Group 3.—*Oils, waxes, gums, resins, etc.*

The following item is deleted:—

Essential oils, natural.

The following item is amended:—

Under the heading 'Oils, the following', oleine (oleic acid); sperm; and stearine (stearic acid) are deleted.

Group 5.—*Chemicals, drugs, medicines, dyes and colours, etc.*

The following item is amended:—

The heading: 'Drugs, medicines and medicinal preparations, manufactured or prepared, except:—

Artisone (artisone acetate).

Aureomycin.

Cortisone (Compound E) (17 hydroxy-11-dehydrocorticosterone).

Cortrophin (ACTH) (adrenocorticotrophic hormone).

Terramycin'

to read—'Drugs, medicines and medicinal preparations, manufactured or prepared, the following:—

Ergotamine Tartrate.

Chloramphenicol (Chloromycetin).

Lobeline Hydrochloride.

Sera, Vaccines, Toxins and Antitoxins.'

Group 13.—*Metal Manufacturers, etc.*

The following items are amended:—

The heading: 'Containers of non-precious metal (whether or not coated, enamelled, galvanised or plated) of a capacity of one gallon or over,'

to read: 'Containers of non-precious metal (whether or not coated, enamelled, galvanised or plated) of a capacity of one gallon or over; not including canteen equipment.'

The heading: 'Containers made of aluminium or aluminium alloys,'

to read: 'Containers made of aluminium or aluminium alloys; not including canteen equipment.'

Elected Chairman

MR. V. F. NOEL PATON has been elected chairman of T. and H. Smith Ltd., chemical manufacturers and manufacturing chemists of Edinburgh. He succeeds Mr. H. G. Sharp who remains a member of the board.

Applications of Chemical Microscopy

Society of Public Analysts Hear Papers

WIDELY differing applications of chemical microscopy were described in three recent papers, presented before a joint meeting of the Microchemistry Group of the Society of Public Analysts and Other Analytical Chemists and the Liverpool and North Western Section of The Royal Institute of Chemistry at Liverpool University on 18 October. The papers are summarised below:

(1) *Some of the Principles of Quantitative Microscopic Analysis,* by J. G. A. Griffiths, B.A., Ph.D.(Cantab), F.R.I.C.

Techniques for the use of the microscope in particle size determinations were described in this paper. Employing visible light the approximate range of dimensions determinable is from 1 mm. (1,000 microns) down to 0.2 microns. For smaller particles it is necessary to make use of dark ground illumination. No information as to the thickness of the observed particles can be obtained. It is possible, however, to count the number and to calculate the dimensions of the outlines seen in the plane of the field. This leads to determination of the percentage composition of mixtures of powders. It is necessary to ensure random distribution of the particles either as a thin layer on a plane surface or in a film of dispersing fluid. This is followed by counts in random fields which enables the total number of particles present in the sample to be computed.

'Ratio Method' of Analysis

The 'ratio method' of powder analysis necessitates addition of an 'internal standard.' This consists of either a powder or a suspension in a dispersing medium, of particles having dimensions of the same order as those of the sample. The particles of the 'internal standard' must, however, be visually distinguishable from those of the sample. A definite proportion of the 'standard' is mixed with the sample. Accurate measurement of the actual quantity of the standard is unnecessary since the number of particles present due to sample and 'standard' are counted in several fields selected at random. Errors caused through measurement of small aliquots of the mixture, are therefore compensated for.

By use of any physical differences such as shape, size, colour or refractive index it is possible to distinguish between particles having similar chemical compositions and those of different origin. Knowledge of the densities of the different materials present can be used to compute from the relative numbers of each kind of particle present the relative weights present, this being dependent on the sizes or size distribution being the same. Should they differ then the volumes must be measured. Using the assumption that the particles are randomly oriented in the plane of the field and by summing the projections of the particles in one direction it is possible to obtain statistical diameters. The cubes of these diameters are proportional to the volumes of the particles. A correction must be made for a thickness factor, as particles have a tendency to settle with their centres of gravity at a minimum distance from the surface of the slide.

Fluorescence Microscopy

(2) *Some New and Simple Techniques for the Application of Fluorescence Microscopy,* by J. King, O.B.E., F.R.I.C., Department of the Government Chemist.

Despite extensive use of fluorescence microscopy on the Continent and in the U.S.A. the technique appears to have been neglected in this country. This may be attributed to the high initial cost of manufactured equipment, which is about £1,500. In the Government Laboratory, however, simple apparatus of the 'tin can' variety has been developed and constructed at a fraction of the above cost and has proved eminently satisfactory. Details were described by Mr. King and illustrated by slides, and the audience, as taxpayers, were left in no doubt as to the economical use made of their money in constructing elegant and efficient apparatus in the Department of the Government Chemist.

The technique of fluorescent analysis may be employed to detect, under favourable conditions, extremely minute amounts of substances which fluoresce under ultra-violet light. In a number of cases they can by suitable treatment be converted into fluorescent substances. Among numerous applications of this are the identification of different arrangements of rings in organic

compounds through observation of the differences in colours of the fluorescence; determination of the homogeneity of powders, and the detection of aneurin in flour when present at a level of around 0.25 p.p.m.

(3) *Applications of Polarisation Microscopy in Chemical Practice*, by N. H. Hartshorne, M.C., M.Sc.(Birm.), Ph.D.(Lond.), F.R.I.C. (The University of Leeds).

Ordinary qualitative analysis does not always give actual positive identification of a substance. It is well known, for example, that qualitative analysis of, say, a mixture of salts, while yielding information as to the ions present, does not elucidate how these ions are combined. In the case of analysis of organic compounds the problem may be complicated by the presence of isomerides. The X-ray powder diffraction method, although often of considerable assistance, is essentially blind in that it does not yield direct visual information.

Polarising Microscope Rapid

An optical crystallographic examination of the material under the polarising microscope frequently yields rapid and positive information not easy to obtain by other methods. The method is essential micro in scale and possesses the added advantage that the sample is not destroyed. Further advantages are that essentially physical characteristics may be identified. These include texture, state of division and knowledge of the crystal forms present.

A number of examples of applications were described by Dr. Hartshorne. Diammonium hydrogen phosphate was detected as an impurity in ammonium dihydrogen phosphate. A salt mixture containing lead, barium, nitrate and chloride was shown to consist of lead nitrate and barium chloride through recognition of the crystalline forms and measurement of the refractive indexes. During the recent war A. Stuart, working on explosives, was able to prove the contamination of RDX by HMX. The HMX was shown to exist as the α-modification in definite inclusions which were very difficult to remove. In this case polarisation microscopy was the only possible method of identification of the exact source and nature of the contamination. A new application in forensic laboratories which, although only in the preliminary stages of development, shows considerable promise, is the identification of barbiturates in viscera. In this instance a hot stage is used.

This paper concluded with short descriptions of some hot stages which have been found suitable for use in this technique. The work of L. Kofler and A. Kofler on the determination of eutectic temperatures was also reviewed.

Canadian Sulphur

Forecast End of Shortage by 1953

CANADA'S sulphur shortage crisis will have been surmounted by 1953. Dr. J. R. Donald, O.B.E., director of the chemicals and explosives division of the Department of Defence Production, predicted recently at a one-day convention of the Commercial Chemical Development Association in Montreal.

He said Canada had received generous treatment from the United States, but she had also taken steps to help herself. As a result of these moves, Canada would next year produce 100,000 tons more sulphur, and the serious shortage would be over by the following year.

Dr. Donald, well-known consultant engineer, told the audience he believed Canada should increase the processing of her natural resources before they were exported. This would help to overcome the trade deficit and also aid in developing the competence of their own chemical engineers, offsetting the drift of trained personnel to the United States. Producers had not been to blame for the deficiencies in the development of the Canadian chemical industry. The country heretofore had been too small and its industries not large enough to provide a base for large-scale chemical production. Freight rates were also a factor in a country like Canada, where the natural resources used in the industry had to be hauled long distances.

However, the United States, he said, would become increasingly dependent on Canadian chemical resources. The chemical industry in Canada had reached the level of about $636,000,000, about four times its total in 1939. The Canadian chemical industry was now going through a $175,000,000 development, the greatest in its history.

Another speaker remarked that Canada's richest prospect lay in her north country. There lay regions virtually unexplored, new resources in the process of being opened up, and vast territory calling for examination.

Saving Scarce Materials

Another Productivity Team Report Issued

SHORTAGE of raw materials, which has for some time been causing concern to a number of industries in Great Britain, has become an even more serious matter recently because of the decision by the Western Powers to carry out a considerable degree of re-armament. One of the main problems is how to satisfy the defence programme while limiting, as little as possible, the demands of civilian consumption which have steadily increased since the war. The position is still further aggravated as the world production of goods has increased at a considerably greater rate than the world output of raw materials. Much is being done to expand the supplies of raw materials in various parts of the world, but most of these projects must, of necessity be long-term in character, and cannot be expected to afford any immediate relief.

It is therefore important that steps should be taken as a short-term measure to encourage the conservation and efficient use of scarce materials, while this may also prove a long-term investment by extending to some degree the life of existing sources of materials. The Anglo-American Council on Productivity accordingly considered that the matter was of sufficient urgency to send a team under the leadership of Sir Graham Cunningham, chairman and managing director, Triplex Safety Glass Co., Ltd., to inquire into what was being done and planned in the United States to conserve scarce materials.

Report Confined to Metals

The report of the team, 'Saving Scarce Materials', was released on 12 November (2s. post free) and its conclusions and recommendations show that while the extent and incidence of the shortages differ between the two nations, much of the information gathered in the U.S.A. could be of value to British industry while at the same time some of the techniques employed in this country are of considerable interest to the U.S.A. and should be made more widely known there. The field of scarce materials proved so large that it was decided to confine the report almost wholly to supply and economy in the use of metals.

Although the team was principally concerned with efforts likely to bring some quick relief to the problem of scarcities, it also had an opportunity to learn something of the long-term planning of material supplies in the U.S.A. In Washington an interesting meeting was held with some members of the President's Materials Policy Commission with Mr. William S. Paley, presiding. The commission was established 'to find to what extent shortages of any production materials are likely to impair the economic growth or to jeopardise the security of the U.S.A. and the free world over the long run'. It is at present reviewing the period for the next 25 years and study groups have been set up to consider domestic reserves, foreign policy, technology, energy and security aspects. Various approaches to the problem are being explored, including losses at extraction, materials from unconventional sources, multi-purpose use of materials, salvage and recovery, and the extension of useful life.

Two Kinds of Conservation

Methods of conservation were also considered by the team which considered that some of the techniques adopted were applicable to several materials. These techniques could be divided into two classes, design alterations, mainly long-term in character, and manufacturing methods, principally short-term devices.

The main conclusions of the team, as outlined in the Report, are:—

1. The shortages of ferrous and non-ferrous metals should be matters of the utmost concern to all the Western nations if they desire to avoid curtailment of output in the engineering field.

2. Great progress has been made recently in the U.S. with the use of very low-alloy or plain carbon steels containing small additions of boron, mainly for components of small section.

3. The addition of boron to suitable steels in the U.K. could save scarce ferro-alloys or alloying elements. More precise information should be obtained as to the potential savings.

4. In the manufacture of jet engines for

aircraft, the U.S. are employing substantially higher proportions of scarce alloying elements than the U.K.

5. The shortage of some non-ferrous metals in the U.S. appears already to be impeding industrial production. Aluminium and magnesium show considerable prospects of rapid expansion and should replace some scarce non-ferrous metals.

6. Vigorous short-term conservation measures are being taken, particularly with nickel, lead and tin These measures deserve further study by British industries.

7. Conservation of plastics and their use as alternatives for metals do not appear to have made substantially greater progress in the U.S. than in the U.K. One interesting development was the use of plastics, alone or in combination with steel or aluminium, for economising in lead in the sheathing of light-duty electrical conductor cables.

8. A study by American industry of joint consultation as practised in Britain might prove helpful in securing a better understanding between management and workers of the problems created by shortages of materials.

The team made the following recommendations:—

1. Existing steel conservation committees in the U.K. should give renewed attention to the properties of lower alloy content steels and to special techniques for their hardening and heat treatment as at present employed on a substantial and increasing scale in the U.S.

2. The close existing contacts between aircraft manufacturers in both countries should be used for a thorough exploration of differences in design and metallurgical practice.

3. Conservation measures being taken in the U.S. with copper, nickel, lead and tin should be further studied by interested British industries.

4. Three new British techniques are of considerable interest to American industry and should be made more widely known in the U.S. They are:—

(a) electro-deposition of combinations of tin-zinc and tin-nickel,

(b) use of ceramic-tipped cutting tools,

(c) use of precision-cast milling cutters.

5. The re-design of manufactured products with particular regard to the conservation of scarce materials is recommended as a continuous activity.

The Field of Rubber

Applications Outlined at Manchester

A MEETING of the North-Western Branch of the Institution of Chemical Engineers was held at Manchester on 10 November when Mr. S. A. Brazier, O.B.E., M.Sc., presented a paper, 'The Field of Rubber and Allied Products in Chemical Engineering'.

Mr. Brazier outlined the properties of vulcanised, soft, natural rubber and of ebonite, and gave examples of the use of these materials in the chemical industry. Because ebonite has a high chemical resistance and soft rubber a high resistance to abrasion, they are useful as linings for chemical plant and as constructional materials for pipes, valves and pumps. The production of metal vessels with linings of ebonite, soft rubber, synthetic rubbers and related elastomers were described in detail with emphasis on the precautions observed and the tests applied to the finished vessel. The design of joints, flanges and welds of lined vessels was considered. Concrete, brick and wooden vessels are successfully lined with rubber, while pickling vats are lined with tile or brick after they have been lined with rubber. Mr. Brazier described the specialised uses of vessels lined with synthetic rubbers, such as neoprene, butyl, plasticised polyvinyl chloride and silicone.

Gaskets and packings are made of natural and of synthetic rubbers. Hoses will convey steam under pressure, some acids and some solvents; specialised constructions suit each use. Rubber mountings and bearings of high flexibility and low hysteresis absorb continuous vibrations but heavy loads must have a low vibration frequency because rubber has a poor heat conductivity. Filter press plates covered with ebonite or soft rubber possess considerable resistance to abrasion. Mr. Brazier concluded an informative lecture with lists of the outstanding advantages of rubbers as constructional materials, the resistance of rubbers to various chemicals and the mechanical properties of the rubbers.

Town Refuse Compost

Valuable Fertiliser Constituents Present

THE conversion of town refuse into compost is an activity to which a considerable amount of attention is now being turned. While municipalities are interested in the useful disposal of the town waste, agriculturalists are paying more and more attention to soil structure and the prevention of erosion and the provision of bacteria-rich humus.

In Holland, particularly, this production of town refuse compost is forging ahead. Already, since 1929, the Government-sponsored N.V. Vuilafvoer Maatschappij 'V.A.M.' (Refuse Disposal Co., Ltd.), has been operating a plant at Wyster, in the province of Drenthe, which converts 150,000 tons of waste from The Hague, Groningen and Zandvoort (total population 700,000) into 120,000 tons of compost a year. In the future, additional plants are to be established at Schiedam, Flushing, Eindhoven, and one large one in the middle of Holland, which will cover, altogether, approximately 2,500,000 of the Dutch population of just over 10,000,000. In addition, some municipalities already operate plants and others are making plans to do so.

Fermentation Process

To prepare the compost the town refuse is taken by specially constructed trains to the decomposing beds and factory. On arrival, the sides of the closed wagons are automatically opened by valves operated from the engine and the waste is shot into ducts on both sides of the track. It is then sprinkled with bacilli-bearing water, which, within 24 hours, raises the temperature to 60 - 70° C. and starts the fermentation process.

The following day more refuse is unloaded on the top of the previous heap. This is again sprinkled and operations are repeated until the ducts are full. It takes four months for the winter refuse to become 'ripe' and eight months for the summer refuse, the latter having 50 per cent to 60 per cent of fermentable organic material, while the winter content is about 20 per cent.

When the fermentation has finished the refuse is taken into the factory, extraneous matter is extracted and the residue pulverised in large hammermills into the finished compost.

V.A.M. Compost Analysis

An analysis of V.A.M. compost shows the following chemical composition:

		Percentage
Useful organic matter (exclusive of uncombusted carbon particles)	4.5	12
Nitrogen (total)	0.4	0.5
Phosphoric acid (soluble in mineral acid)	0.4	0.5
Potassium (soluble in water)	—	0.2
Calicum oxide (soluble in mineral acid)	—	3.0
Magnesium oxide (soluble in mineral acid)	—	0.3
Carbon dioxide (driven out with hydrochloric acid)	—	1.5
Moisture	25	30
Loss due to burning	18	25
Copper	—	0.04
Manganese	—	0.03
Boron	0.002	0.005
Molybdenum	—	0.003

The compost consists of about one-third stabilised humus (insoluble in acetyl-bromide) and two-thirds unstable humus, which provides rich feed for the bacilli. As a result of this richness the bacilli in the soil increase considerably, which, besides improving the texture, makes phosphate manures available, while nitrogen is kept longer and becomes regularly available for the plant.

In addition to the trace elements for which figures are given, the compost contains other minor elements such as iodine, zinc, vanadium and chromium.

Nitrogen in V.A.M. compost is available to the plant to the extent of about 15 per cent; phosphates to about 10-15 per cent in the first year and a similar amount in the second, and presumably third years. The potassium, calcium and magnesium are 100 per cent soluble and therefore fully active. The organic matter content of the compost cannot be determined by the usual heating method because this gives much too high a figure due to the unburnt coal particles from the ashes of the house fuel.

The compost of summer refuse contains 720,000,000 bacteria per gram of damp material; winter compost contains about half this number. Garden mould, by comparison, contains about 150,000,000. The presence of copper is useful in fighting reclamation disease in soil, while it is

interesting to note that when the Isle of Walcheren was reclaimed after its wartime flooding one of the main deficiencies was found to be boron.

The effect of the magnesium is noticeable after a dressing of compost since magnesium deficiency has been on the increase in Holland. On the other hand the effect of the lime is such that the use of compost is not recommended on light soils where *p*H is high. It is best used on light soils with a *p*H of 5.2 or lower. Usual dressing of compost is 50 tons per hectare (20 tons per acre) every four or five years. It is, of course, used in addition to, and not as a substitute for, artificial chemical fertilisers.

Science Scholarships

Opportunities in the Commonwealth

THE Royal Society Empire Scientific Conference and the British Commonwealth Scientific Official Conference in 1946 recommended the preparation of a list of postgraduate scholarships available for scientific study within the Commonwealth. The task of compiling the list was assigned to the British Commonwealth of Nations Scientific Liaison Offices in London.

When BCSO (London) opened in 1948 consideration was given to implementation of the recommendation. Thanks to the generous co-operation of universities, institutions and Government departments throughout the Commonwealth the publication 'Inter-Commonwealth Post-Graduate Scholarships in Science' has now been completed.

Since the main objective of the list is to encourage the movement of scientists within the Commonwealth, only those awards open to members of at least one Commonwealth country or Colony other than the awarding one have been included.

Entries are set out in tabular form showing, in addition to the names of the scholarships and the agencies awarding them, details of the fields of study, where tenable, duration and value, closing dates for applications and the addresses to which these should be sent. There are more than 350 separate entries in the list: many of these cover a number of scholarships so that the total number of available awards is much greater. The list (HMSO, 5s.), is therefore a valuable work of reference for students and educational authorities.

The price has been fixed at the lowest possible level having regard to present publishing costs in an endeavour to bring the document within the reach of university students throughout the Commonwealth.

New Tanker Launched

Cost of Providing the World's Oil

VELLETIA, the latest addition to the fleet of 'V' class ships being built to carry crude oil from the Middle East to Shell's new refineries at Stanlow, Cheshire, and Shell Haven, Essex, was launched at Wallsend-on-Tyne on 31 October.

The ceremony was performed by the Hon. Mrs. Frank Hopwood, wife of a managing director of the Royal Dutch/Shell group of companies. *Velletia* was built in the same berth from which *Velutina*, one of her three sister ships and the first super-tanker to be constructed in Europe, was launched by H.R.H. Princess Margaret in April last year.

Concern at the effect which taxation and inadequate depreciation allowances were having on the capital cost of providing the world with its rapidly increasing oil requirements, was expressed by Mr. J. W. Platt, a managing director of the Royal Dutch/Shell group of companies, speaking at the ceremony.

Pointing out that, as a result of the insistent demand, world consumption (excluding U.S.A. and U.S.S.R.) over the next five years is likely to rise by at least one third, an increase of no less than 60,000,000 tons, Mr. Platt stressed that, quite apart from normal maintenance and replacement costs, the extra capital which the oil industry would need in order to handle this additional quantity of oil would be well over £1,200,000,000 —£650,000,000 for additional refinery equipment, £300,000,000 for new tankers and a further £300,000,000 for distribution facilities.

The British share in this part of the world's oil business was approximately 40 per cent. much of which would have to be financed out of current funds, because of inadequate depreciation allowances. Mr. Platt emphasised that unless the programme was met, the world would be short of the energy it needed; furthermore, unless the British interests played their full part, our country would lose a most valuable contribution to its precarious balance of payments.

American Newsletter

(From Our Own Correspondent)

THE Dewey & Almy Chemical Company is reported to have developed a liquid chemical 'blanket' for use in wire galvanising, which will enable wire manufacturers to make substantial savings of zinc and money in galvanising operations. This chemical blanket keeps oxygen away from the surfaces of the spelter pans of molten zinc through which wire to be galvanised is run. Oxygen causes crusts of zinc oxide containing up to 80 per cent pure zinc to form on pans, and notwithstanding recovery operations, the zinc wasted in these crusts runs into thousands of dollars annually, a spokesman of the company said. Field tests have indicated that with the blanket, savings in pure zinc of 20 to 50 per cent of raw spelter per ton of wire run can be realised (the amount of saving varies with the type of operation, the weight of the wire and other factors). In operation the liquid chemical rests directly on the molten zinc, but does not mix with it, and permits the wire to glide through the bath without air gaining access to it. Conventional 'dry blankets' of oxide ash or other materials are porous and do not stop crusts from forming. Other advantages of the new blanket are said to include a reduction of splattering at the point where the wires enter the pan and when 'pigs' are added. This is attributed to the greater surface tension of the liquid blanket as compared to the dry blanket. Moreover the blanket virtually eliminates the usual noxious zinc oxide fumes by preventing their formation, it is said.

* * *

POLYETHYLENE is being used by the Southern Lead Burning Company, Atlanta, Georgia, for coating mild steel containers which are to carry muriatic acid. Flame-sprayed on to the surface of the tank, polyethylene protected a 4 ft. by 5 ft. by 3 ft. deep tank from corrosion, and the steel showed no defects after being used to hold the acid for six weeks. The steel used for the tank was 3/16 to ¼ in. mild steel plate, and before being coated it was sand-blasted to remove rust and impurities and to improve the mechanical bond between coating and metal. Spraying was done with a flame-spraying gun which was used for preheating, and several passes were needed to build up the coating to the required thickness of .05 in. The speed of spraying in each pan was found to be comparable with that of paint spraying. Spark gap testing detected no porosity of the coating after application, and the coating itself was undamaged mechanically after the six weeks' test.

* * *

A NEW dry battery developed by the U.S. Army substitutes plentiful low-grade domestic manganese dioxide for the high-grade product found in sufficient quantity only on the African Gold Coast. According to Army officials, the new battery will last twice as long as those now in use. Dry batteries have about 1,000 military applications. While the new battery is expected to cost slightly more to make, substantial economies will result from its doubled life and from reduction in storage and shipping costs. The development, the Army says, resulted from research contracts originated by the Signal Corps in 1946 and studies made at the Signal Corps Engineering Laboratories. Once the principle was perfected and tested, it was ascertained that manufacture on a production line basis was practical and an industrial mobilisation contract was awarded.

* * *

ANOTHER method for obtaining high yields of vitamin B_{12} by using propionic bacteria to ferment nutrient solutions or mashes that contain skim milk and whey, has been developed by dairy research workers of the U.S. Department of Agriculture. The propionic bacteria are the ones that Swiss-cheese makers add to the milk to produce the holes or 'eyes' in gruyère and also to help develop its characteristic flavour. In addition to producing vitamin B_{12}, the new fermentation process produces propionic acid at the same time. Propionic acid salts are important in several industrial processes, such as preventing mould growth in bread and other foods.

* *

AMERICAN production of a wide variety of chemicals during the first six months of 1951 increased considerably over output during the first six months of 1950, according

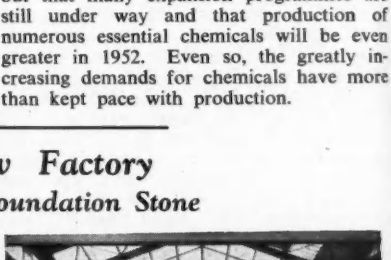
to a survey just completed by the U.S. National Production Authority (NPA). A few chemicals showed a jump of 100 per cent or more, while many rose 20 to 50 per cent. The biggest increase of any of the 68 chemicals covered in the survey was made by acetanilide, used in making sulpha drugs, sedatives and other products. The production of this chemical rose from 1,358,000 pounds in the first six months of 1950 to 3,670,000 pounds in the first six months of 1951, or an increase of 170 per cent. Benzene hexachloride (BHC) showed an increase of 118 per cent (from 25,515,000 to 55,583,000 pounds), while production of finished light sodium carbonate (soda ash) was up 112 per cent from 1,068,595 to 2,264,899 tons, and the production of pyridoxine (Vitamin B_6), jumped 100 per cent, from 7,000 to 14,000 pounds. Substantial gains were made in a number of essential chemicals. Styrene production was 38 per cent greater in the first half of 1951 than in the similar period of 1950, and the output of DDT was 58 per cent greater. Production of 2,4-D weed killer was up 62 per cent, and carbon tetrachloride increased by 22 per cent. Phenol, together with other chemicals, dyes, paints and varnishes, detergents, photographic developers, plastic compositions, synthetic rubber and printing textiles, was produced at a rate 27 per cent greater in the first half of 1951 than in the same period a year before. NPA officials point out that many expansion programmes are still under way and that production of numerous essential chemicals will be even greater in 1952. Even so, the greatly increasing demands for chemicals have more than kept pace with production.

APV's New Factory

Chairman Lays Foundation Stone

DR. Richard Seligman, Founder and Chairman of The A.P.V. Co., Ltd., laid the foundation stone of the company's new factory on a 17-acre site at Manor Royal, Crawley New Town, on Saturday, 3 November, 1951. Founded by Dr. Seligman in 1910, the company has since grown to such an extent it can no longer be accommodated in its present four factories and production is to be transferred to the larger premises being built at Crawley. The ceremony was attended by over 700 employees and their wives who had travelled down from London in 17 motor coaches.

Dr. Seligman Laying the Foundation Stone



The Main Fitting Shop Bay

In an introductory speech, Mr. E. Whitlock, works director, spoke of the high esteem which all the workers held for Dr. Seligman, and emphasised the exceptional spirit which prevailed in the company due to the principles which Dr. Seligman had followed in building it up to its present position.

At the conclusion of the proceedings, visitors were able to inspect the factory site, on which the steel framework was in process of erection. The new factory is to be completed in two stages, the first of which will occupy a floor space of five acres and will be ready by March, 1952.

The Chemist's Bookshelf

CHEMISCHE TEXTILFASERN, FILME AND FOLIEN. Edited by Dr. Rudolf Pummerer. Ferdinand Enke Verlag Stuttgart. 1951. Pp. 160. Dm. 20.

This is the first number of a serial publication on textile fibres, films and foils, to be issued in seven or eight parts each of 160 pages, which will be published at intervals of one to two months and will be completed by the autumn of 1952. As the sections of this voluminous work are contributed by specialists in their respective fields, and are supplemented by information compiled by the editor from other sources, the book fulfils the object of providing in a serial form data covering all the aspects of production, properties and applications of the many types of textile fibres, films and foils.

Some idea of the scope of this first number is indicated by the following list of contributions:—Introduction by the editor, Dr. R. Pummerer (University Erlangen), pp. 1-6; 1, 'Chemical Textile Fibres,' by Professor Dr. K. Freudenberg (Heidelberg), pp. 7-23; 2, 'The Supermolecular Building of Cellulose,' by Professor Dr. O. Kratky (Graz), pp. 24-106; 3, 'Cellulose Production,' by Dr. Wilhelm Overbeck (Curitiba, Brazil), pp. 107-155; 4, 'History of Chardonnet Silk,' by Professor Dr. Theodore Liser (Darmstadt), pp. 157 and following pages (to be continued).

The second part, dealing with films and foils will contain the following sections: Testing of plastic foils; films and foils from cellulose and its esters, and foils from synthetic materials.

Later numbers in the series will deal with alginate fibres and rayon in manufacture and use; dyeing and printing of chemical fibres; finishing of rayon, cellulose and synthetic fibres; washing and bleaching in household and industry; properties of glass-silk and glass-fibres; sizing; analytical chemical testing of fibres and mechanical, technological examination.

Each chapter is supplemented by numerous illustrations, tables and references. As a result of co-operation between experts the work should prove of service to producers and users, and to technicians associated with the modern textile industry, particularly when the subject index, which will be published with the last number of the series, is available.—F.N.

DIE METALLURGIE DES ZINKS. By F. M. Loskutow (German translation by Fr. Krantz). Verlag Wilhelm Knapp, Halle, Saale. 1951. Pp. XI + 296. Dm. 17.

This book, volume VI of the publishers' series 'Die Metallhüttenpraxis in Einzeldarstellungen', presents a comprehensive discussion of modern practice in the zinc industry of the Soviet Union, to which the translator has added some chapters on German and international methods. The Russian zinc industry was built up during the last five-year plan and has since developed by the use of indigenous ores to such an extent that it may soon be able to satisfy home consumption. The book fills a gap in the Russian literature on zinc, being based on international references and the author's personal experiences as a university teacher and in foundry practice. The German translation is also welcome, as no similar publication has come out in Germany since the book by V. Tafel in 1928.

The text of the book is divided into two parts—the pyrometallurgy and electrometallurgy of zinc, to which the translator has added a chapter on wet metallurgical processes and some results of original investigations in co-ordinated form. The book incorporates new technical developments that were made during and since World War II, and while it is intended primarily as a textbook for students, should also be a worthwhile book for executives.

The publication is of timely significance in view of the mobilisation of the non-ferrous processing industries for rearmament. It contains 104 illustrations and charts, and offers material which has not been presented before in collected form.—F.N.

Canadian Industries Ltd.

Increased Sales and Capacity

SALES of Canadian Industries, Limited (of which a large proportion of the capital is owned by I.C.I.) for the first nine months of 1951 were almost one-quarter higher than for the corresponding period of last year, H. Greville Smith, president, announced recently. The increase of about one-third in the federal income tax rate over the average rate applicable in 1950 largely offsets the effect of higher sales on earnings for the first three-quarters of the year.

For the most part the advance in sales represents the increased flow of goods coming from newly expanded plant facilities, although values are also affected by higher prices for a number of products. Greater nylon yarn and staple capacity at Kingston made an important contribution to the higher sales, and output has been obtained throughout the year from a fifth 'Cellophane' casting machine which came into operation in the middle of 1950. Sales of polythene film, production of which started in March of last year, have been limited only by availability of raw materials.

For the first half of the year demand for practically all products taxed the company's manufacturing capacity to the utmost, and at times shortages of essential raw materials made it impossible to meet all requirements. A moderate lessening of the extremely high level of demand became apparent in third quarter, however, and sales increases over the corresponding 1950 figures were not as marked as in preceding months. Export markets have readily absorbed available quantities of certain products for which production is temporarily exceeding domestic requirements.

Plans Proceeding

Plans for the company's plant expansion programme have been proceeding rapidly and work has already begun on a 1,500 acre site at Maitland, Ont., for the construction of a plant to produce important intermediate materials used in the manufacture of nylon. Good progress is being made in erecting the new explosives plant at Calgary, Alberta, which will be using a continuous nitration process employed for the first time in North America.

Construction of the sixth cellulose film casting machine at Shawinigan Falls, Quebec, is going ahead, and other projects under way include a plant at Copper Cliff, Ontario, to manufacture sulphur dioxide from smelter fumes (thus helping to relieve Canada's acute sulphur shortage) and an important expansion to the coated-fabrics plant at New Toronto, Ontario. Plans for the erection of a plant of considerable size to manufacture polythene are in the final stages of consideration. Other projects and plant expansion plans are in the development stage.

In the five years ending 1950, new plant construction by the company and additional working capital, needed to handle the higher level of operations, required a total of $34,000,000. The expansion programme for the next three years will call for a total outlay much in excess of this previous record.

Preservatives in Food

AS previously announced by the Ministry of Food, a Sub-Committee of the Foods Standards Committee was set up in January, 1951, with the following terms of reference:

'To review the Public Health (Preservatives, etc., in Food) Regulations and to make any recommendations the Sub-Committee may consider desirable for the amendment of the Regulations'.

Investigations by the Sub-Committee will cover the use in foods of such substances as anti-oxidants, anti-mould agents, solvents and emulsifying (including stabilising, anti-staling and foaming) agents, as well as preservatives and colouring matters. It is intended to prepare separate reports about each of these classes of substances.

Preliminary discussions have shown, however, that further and more detailed information is required about the use, or proposed use, in foods of each of the above-mentioned classes of substances, including the purpose served by such use, and the amounts of particular substances added to foods. The Sub-Committee is, therefore, anxious to have the benefit of the views of interested parties on these matters, and would welcome information, particularly on biochemical, physiological and toxicological aspects.

Any person or organisation able to assist by the submission of such data is invited to write to the Secretary of the Sub-Committee at the offices of the Ministry of Food, Food Standards and Labelling Division, 47 Portman Square, London, W.1.

HOME

Simon-Carves Order

Shipping of material began last week by the Cheadle Heath firm of Simon-Carves for a large pyrites flash-roasting acid plant in Athens. This is a new order secured by the firm's chemical plant department, who say that in view of the sulphur shortage, they have a large volume of work on pyrites plants being vigorously pressed forward. The firm has lately started up a sulphuric acid concentration plant at Grangemouth for British Petroleum Chemicals, a sulphur-recovery plant at Stanlow for Shell, and a hearth roaster pyrites-burning sulphuric acid plant at Knottingley for Synthetic Chemicals, Ltd.

Damaging Fire

Fire broke out shortly before midnight on 7 November at the premises of the Alumina Co., Ltd., on the Sankey and St. Helens canal, near Muspratt's Works, Widnes. Little of the works remained undamaged, except the boiler-house and offices. Surrounding I.C.I. property was safeguarded by the brigades, who succeeded in keeping the blaze confined to the Alumina premises.

To Discuss Proposal

The Burmah Oil Company and the Shell Group, the two partners in Burmah-Shell India, are considering the erection of a refinery at Bombay and at the request of the Government of India a party will leave London this week-end to discuss the proposal with them in Delhi.

Arrived Safely

The delivery to Forth Chemicals of the 130 ft. fractionating tower two days ahead of schedule completed the haulage of the longest unit ever transported in Great Britain. The 130 ft. long tower demanded careful handling at every stage of the journey and final delivery at Grangemouth ended a period of tension for all concerned with the work. Development of the refinery and allied projects in Scotland has given haulage interests some of their most intricate jobs to date and it is very much to the credit of the transport men that all have been completed successfully despite the difficulties under which they were undertaken.

Parliamentary Committee

There will be a meeting of the general committee, Parliamentary and Scientific Committee, at 5.30 p.m. on Tuesday, 20 November, in Committee Room 12 at the House of Commons. A report will be received from the Steering Committee on future arrangements and Sir Nelson Johnson, K.C.B., D.Sc., Director of the Meteorological Office, will address the committee on: 'The Organisation, Work and Plans of the Meteorological Office.'

The Chemical Society

Privileges accorded to its Fellows are pointed out in a notice recently issued by the Chemical Society. Attention is also drawn to the special arrangements for Fellows under 25 years of age, which include a reduced subscription.

'Electrician Red Book'

Those engaged in the chemical industry who make contacts with the purchasing officers of the British Electricity Authority will find a wealth of information in 'The Electrician Red Book,' just published by Benn Brothers, Ltd., 154 Fleet Street, E.C.4. price 30s. post paid. Details are given of the personnel of the Central Authority, the Generation Divisions, the Electricity Boards, Sub-Areas, etc., together with the names of power station superintendents. In all cases addresses are given, and indices to personnel, place names and power stations, facilitate the speedy finding of the information required.

Celebration Luncheon

Sir Robert Renwick, addressing 250 members and friends of the Society for Individual Freedom at a celebration luncheon in London last Thursday to mark the result of the General Election, said, 'We must take what is coming to us with a smile; at least we know the country is on the right road and is progressing down the right way of that road.' The Institute of Directors, he said, were sponsoring the free enterprise campaign and they hoped to spend over £200,000 in the first year.

OVERSEAS

Zinc Refinery for Quebec

As soon as the choice of site is settled, Quebec will have its first zinc refinery, Mr. J. P. Beaulieu, Quebec's Minister of Industry and Commerce, told the annual convention of the Canadian Chamber of Commerce on 3 November. The refinery will pool the output of six or seven zinc mines, and construction will cost about $15,000,000. As it will require 500,000 h.p., it will be situated on the shores of the St. Lawrence near a hydro-electric source.

Fluorine Resistance Stressed

The advantages of fluoro-compounds when it comes to chemical and physical resistance were stressed recently by the manager of the Minnesota Mining and Manufacturing Company in America. Among products expected to benefit, he mentioned dyes, motor lubricants and coolants, plastics, fire extinguishers, detergents, pharmaceuticals, resins, coatings, photographic film, refrigerants and solvents. The carbon-fluorine bond is so much stronger than the normal carbon-hydrogen bond that fluoro-chemicals also bestow great heat-resistant properties on the substances of which they are components. The production of fluoro-compounds is under way in semi-commercial quantities by the company. (For an account of British and American fluoro-hydrocarbon research and production *see* THE CHEMICAL AGE, 8 September 1951).

A New Electrolyser

The Montecatini Company of Italy have constructed a new electrolyser of filtro-press type for the production of hydrogen. This electrolyser, suitable for high tensions, is said to represent a great improvement in comparison with other similar types, mainly because of the simplicity of its electrode which considerably reduces the cost of the whole plant. The technicians of the company are, furthermore, testing frames made of synthetic resin instead of metal. This innovation solves some difficult problems connected with insulation, secondary electrolysis, constant purity of the gases produced, and may represent a revolutionary step in the field of hydrogen-producing and similar electrolysis plants.

To Share Swiss Markets

The new chemical works of Erbis, Ltd.—a partnership of Erba, Ltd., of Zurich, Switzerland, and Verolit, Ltd., of Tel-Aviv—is to manufacture auxiliary chemicals required in the textile and leather industries. The agreement with the Swiss firm is reported to grant Erbis, Ltd., a share in existing markets in the Balkans and in the countries of the Middle East, with the rights to sell under established Swiss trade names.

French Get Contract

Reports from Israel state that Fertilisers & Chemicals, Ltd., have recently placed an order with Batignolles-Chatillon for the fabrication and erection of a nitric acid plant. It is understood that original inquiries made for one in this country failed to lead to a positive result owing to the impossibility of obtaining credit terms; the contract went, therefore, to the French firm, although the cost is reported to be higher. This plant, which is part of the I£5,000,000 expansion programme of Fertilisers & Chemicals, Ltd., will contribute in no small measure to the expansion of Israel's production of fertilisers, using mainly indigenous raw materials.

To Pursue Negotiations

Lord Glenconner, chairman of Palestine Potash, is expected in Tel-Aviv next week to pursue negotiations with the Israeli authorities for a resumption of work in the potash plant by the Dead Sea which has been idle since April, 1948.

The Israeli Government on Monday appointed a Ministerial Commission to negotiate with the company and make recommendations for a resumption of operations.

Rayon Plant in South Africa

The proposal by Courtaulds and the Italian concern Snia Viscosa to establish a rayon wood-pulp producing industry in South Africa has been carried a stage further. Registration has been announced by the South African Government-sponsored Industrial Development Corporation of the South African Industrial Cellulose Corporation (Pty.), with present issued capital of £6,000 held jointly in equal proportions by Courtaulds and Snia Viscosa. Ultimate capital is expected to be about £7,000,000.

PERSONAL

The following awards of Medals have been made by the President and the Council of the Royal Society.

The Copley Medal to PROFESSOR D. KEILIN, F.R.S., for his fundamental researches in the fields of protozoology, entomology and the biochemistry of enzymes.

The Davy Medal to SIR ERIC RIDEAL, M.B.E., F.R.S., for his distinguished contributions to the subject of surface chemistry.

The Hughes Medal to PROFESSOR H. A. KRAMERS, for his distinguished work on the quantum theory, particularly its application to the optical and magnetic properties of matter.

MR. REGINALD BARTON, a director of I.C.I. Salt Division, retired from the company's service on 31 October last. He became a director of the Salt Union, Ltd., in 1929 and was appointed a delegate director when the Salt Union became part of I.C.I. in 1937.

For many years Mr. Barton has been a prominent figure in Mid-Cheshire local government. He has been the chairman of the Northwich Salt Confederation and of the Mid-Cheshire Water Board. Mr. Barton is a keen supporter of local sporting activities, and the principal sports ground at Winsford—The Barton Stadium—is named after him.

MR. ALEXANDER MISCAMPBELL, managing director of I.C.I. Salt Division, also retired from the company's service on 31 October after 32 years with Imperial Chemical Industries and the Salt Union, Ltd. Mr. Miscampbell was born in 1889 at Carrickfergus, Northern Ireland, and he joined the Salt Union, Ltd., in 1919 as assistant works manager of their Carrickfergus works. He was transferred to Stoke works in 1933 as manager of the Worcestershire District. In 1939, Mr. Miscampbell was appointed a delegate director of the I.C.I. Salt Division board. He became joint managing director of the division in 1941 and managing director in 1945.

DR. PATRICK C. YOUNG, 45-year-old British scientist, has been appointed head of the United Nations Educational, Scientific and Cultural Organisation science co-operation office at Delhi, in succession to DR. ALEXANDER WOLSKY, who takes charge of a similar office opened in Djakarta, Indonesia. Before joining Unesco, Dr. Young was counsellor in OEEC, where he was responsible for matters of technical assistance and development, scientific research and exchange of scientific and technical information.

The following officers were elected for 1951/52 at the annual general meeting of the British Colour Makers' Association held in London on 7 November: *chairman*: V. WATSON (Cromford Colour Co., Ltd.); *vice-chairman*: C. M. BEAVIS (Golden Valley Colours, Ltd.); *hon. treasurer*: C. G. A. COWAN (Cowan Bros. (Stratford), Ltd.); *secretary*: ALLAN J. HOLDEN. The second annual dinner of the association was held at the Mayfair Hotel on the previous day when MR. HARRY JACKSON, joint managing director of the Dyestuffs Division of Imperial Chemical Industries, Ltd., was the principal guest.

Among the thirty leading British industrialists attending the First International Conference of Manufacturers in New York from 2-5 December will be MR. S. P. CHAMBERS, finance director I.C.I., Ltd., DR. H. CLARKE, managing director, James Booth & Co., Ltd., SIR JOHN HANBURY-WILLIAMS, chairman, Courtaulds, Ltd., MR. C. G. HAYMAN, director, The Distillers Co., Ltd., SIR GEORGE LEGH-JONES, managing director, 'Shell' Transport & Trading Co., Ltd., MR. W. H. PILKINGTON, chairman, Pilkington Bros., Ltd., and MR. D. D. WALKER, joint managing director, Evershed & Vignoles, Ltd.

The purpose of the Conference is to enable leading industrialists of the United States, Britain and Western Europe to secure, by a personal exchange of views, a better understanding of each others' problems, and to discuss the efforts now being made to promote higher productivity.

Publications & Announcements

RECENTLY issued by British Industrial Solvents, Ltd., is a catalogue of organic chemicals marketed by them. Among information given against each chemical is the specification, methods of testing, properties, storage and handling problems and regulations, and commercial information. It is a stiff-backed book, clearly laid out. This edition is the third since the war, and contains at the back convenient appendices on various determinations, conversion tables, lists of solvents and products, chemical formulæ, data tables, and applications of the various products listed in the catalogue.

* * *

HILGER & Watts have issued a leaflet on their Barfit Wavelength Spectrometer which employs a constant deviation prism. One of the spectrometer's outstanding features is its adaptability, since the component parts mounted on the base can be interchanged with others, giving automatic precise alignment, say the makers, without the need of verification by the users. Accessories, too, are automatically aligned on the accessory bar. By the addition of a sensitive thermopile the instrument may be used in the near infra-red. The descriptive pamphlet covers some of the principal accessories, but a fuller catalogue is available on request.

* * *

ANOTHER issue of 'Science News' (No. 22) from Penguin Books, has just made its appearance. This excellent little book, which gives a few selected articles on subjects of interest to all the many branches of science, covers ground stretching from the acceleration of charged particles to the Assam earthquake of 1950. An article on photosynthesis elaborates the present theory that the reduction of carbon dioxide in the plant is an indirect one carried out *via* a 3-carbon carboxylated product and a subsequent reduction cycle, not, as previously thought, *via* formaldehyde as a starting substance. There are other excellent articles on colour specification and measurement, patterns of muscular activity in posture and movement, hurricanes, and a research report at the end dealing with such varied subjects as protein structure, electric eels, microscope research and other subjects.

A CATALOGUE of streamlined hydrometers is being issued shortly by J. W. Towers & Co., Ltd. This contains descriptions and prices of their entire range of hydrometers, saccharometers, brinometers, alcoholometers, etc. All these are of guaranteed accuracy, say the company, and types of hydrometer in their streamline design not shown in the catalogue can be quoted for on request. A thermo-hydrometer is also available, as described in the catalogue.

* * *

A DIGEST of high-vacuum equipment for industry, research and education is now available from W. Edwards & Co. (London), Ltd. This describes the company's 'Speedivac' rotary and diffusion pumps, vacuum pipeline outfits and high vacuum gauges. Vacuum coating equipment by the new 'cathodic sputtering' or 'evaporation' techniques is also mentioned, as well as freeze drying and vacuum sublimation equipment. An electron diffraction camera developed on the basic principles of Professor G. I. Finch and containing a cold cathode and other advantages is described, together with a vacuum hotplate which is, in effect, a small vacuum over 12 cm. in diameter and 10 cm. high with an evacuated glass bell jar covering an electric hotplate with radiation cover. This company recently brought out 'Vacuum', a new journal designed to report on advances in high vacuum technology and vacuum matters generally (*see* CHEMICAL AGE, 20 October, 1951).

* * *

INDUSTRIAL eye shields claimed to give complete protection to the eyes without discomfort to the bridge of the nose or the ears are now being made by J. & S. Newman, Ltd., of 100 Hampstead Road, London, N.W.1. 'Safespex' are said to be unsplinterable and well-ventilated goggles, tuned to individual and institutional requirements (*e.g.*, green for welding, red for Xray work, grey-blue for sun glare and clear for general use), and giving a completely unrestricted field of vision. They may also be worn over ordinary spectacles, as they rest only on the cheek bones and forehead, with an elastic band holding them in place round the head.

Next Week's Events

MONDAY 19 NOVEMBER

Society of Chemical Industry
Bradford: Technical College, Great Horton Road, 7 p.m. (with Bradford Chemical Society). W. G. Marskell: 'Modern Developments in the Field of Combustion'.

Manchester Literary and Philosophical Society
Manchester: College of Technology, 5.30 p.m. Joule Memorial Lecture. Sir John Cockcroft (director AERE): 'Industrial Application of Atomic Energy and its Products'.

Electrodepositors' Technical Society
London: Northampton Polytechnic, St. John Street, Clerkenwell, E.C.1. S. G. Clarke and J. F. Andrews: 'A New Method for Testing the Thickness of Zinc on Small Parts'.

Purchasing Officers' Association
Ilford: Valentine Hotel, Perth Road, 7 p.m. Film: 'Light Alloy Castings' (Birmingham Aluminium Casting (1903) Co.

Industrial Distributors (Sales), Ltd.
London: South East London Technical College, Lewisham Way, S.E.4, 7 p.m. P. Grodzinski: 'Diamonds in Physical Instruments'.

Institute of Packaging
Birmingham: Imperial Hotel, 2.30 p.m. National meeting organised by Midland Area. C. F. Lein: 'Pliofilm as a Packaging Material'.

TUESDAY 20 NOVEMBER

Chemical Engineering Group (SCI)
London: Burlington House, Piccadilly, W.1, 5.30 p.m. Professor D. M. Newitt: 'Recent Trends in Chemical Engineering'.

Institute of Petroleum
Manchester: Engineers' Club, Albert Square, 6.30 p.m. Dr. H. K. Whalley: 'The Petroleum Industry of N.W. England'.

Royal Institute of Chemistry
Welwyn Garden City: The Cherry Tree, 8 p.m. (with Welwyn Garden City Scientists' Club). Professor F. S. Spring: 'Some Recent Developments in Steroid Chemistry'.

Textile Institute
Bradford: Midland Hotel, 7.15 p.m. (with the West Riding Section of the Society of Dyers & Colourists). C. S. Whewell: 'The Finishing of Cloths Containing Wool and Synthetic Fibres'.

Purchasing Officers' Association
Birmingham: Grand Hotel, 6.30 p.m. 'Super Refractories', a new film of the Carborundum Co., Ltd., and a technical speaker.

Institute of Fuel
London: Institution of Mechanical Engineers, Storey's Gate, S.W.1, 5.30 p.m. S. A. Burke and G. A. Sparham: 'Automatic Control Systems for the Coal Feed of Gas Producers'.

WEDNESDAY 21 NOVEMBER

OCCA (London Section)
London: Manson House, 26 Portland Place, W.1, 7 p.m. F. Chapman: 'Petroleum Chemicals and the Paint Industry'.

Society of Chemical Industry
Birmingham: University Mason Theatre, Edmund Street, 6.30 p.m. Joint meeting of the Corrosion Group and Birmingham and Midlands Section, 6.30 p.m. J. Welsh: 'Corrosion in Gas Burning Appliances'.

The Chemical Society
Durham: Science Building, South Road, 7.45 p.m. Joint meeting with RIC and SCI. Professor J. W. Cook: 'The Structural Chemistry of Colchicin'.

Royal Institute of Chemistry
London: Blackwall Lane, S.E.10, 2 p.m. Visit for Registered Students to Fuel Research Station.

London: Waldorf Hotel, Aldwych, W.C.2, 6 p.m. Annual general meeting, followed by a lecture on matters of professional interest.

Incorporated Plant Engineers
Bristol: Grand Hotel, 7.15 p.m. Dr. S. G. Gyngell: 'Corrosion Problems'.

Institute of Fuel
Manchester: Engineers' Club, Albert Square, 6.30 p.m. L. J. Flaws and W. Hill (Fuel Research Station): 'Comparative Tests on Commercial CO_2 Recorders'.

Manchester Metallurgical Society
Manchester: Engineers' Club, Albert Square, 6.30 p.m. W. Ramsden (British Non-Ferrous Metals Research Association): 'Spectrographic Analysis'.

Royal Microscopical Society
London: BMA House, Tavistock Square, W.C.1, 2.30-9.30 p.m. Exhibition: 'How Industry Is Using the Microscope', to be opened by A. J. Philpot, BSIRA director.

[continued on page 680

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

AMBER CHEMICAL CO., LTD., London, S.W. (M., 10/11/51). 4 October, charge to Swiss Bank Corporation, securing all moneys due or to become due to the bank from the company, Verpine Co., Ltd.; Amber Pharmaceuticals, Ltd.; Vialit Co., Ltd.; Chas. H. Windschuegl, Ltd.; and R. T. Burley, Ltd.; charged on Cubitt Town Wharf, Wharf Road, Poplar, with fixtures. *Nil. 17 June, 1951.

New Registration

K. W. Chemicals, Ltd.

Private company. (500,974). Capital £20,000. Manufacturers of and dealers in all classes of chemicals, etc. Directors: C. P. Percy, K. Williams and Maj. J. P. Ball. Reg. office: Kern House, 36/8 Kingsway, W.C.2.

Company News

Lawes Chemical Co., Ltd.

Profit of £38,502 (after tax) for the year ended 30 June, 1951, is announced by the Lawes Chemical Co., Ltd. A dividend of 7 per cent (same) is recommended.

Increases of Capital

The following increases of capital have been announced:—MONCKTON COKE & CHEMICAL CO., LTD., from £210,000 to £250,000; HEMINGWAY & CO., LTD., from £109,000 to £200,000.

Change of Name

The following changes of name have been announced:—HUME & CO. (CHEMISTS), LTD., to HUME & CO. (WHOLESALE CHEMISTS), LTD.; BRONCHOVYDRIN (1945), LTD., to WORTH WHILE DRUG STORES 1945), LTD.

Market Reports

LONDON.—There has been no contraction in the overall demand for industrial chemicals and pressure for deliveries has again been reported both from home consumers and for export. Prices generally are steady with a firm undertone. The general run of the potash and soda products is without outstanding feature and a steady demand continues for the trisodium and disodium phosphates at the higher rates now ruling. The solvents are an active section while the red and white leads are moving well at unchanged rates.

MANCHESTER.—Firmness continues to be the dominant feature of the Manchester chemical market and while few actual changes have to be recorded during the past week there has been a further strengthening in the prices of one or two lines. The textile and allied industries in Lancashire and the West Riding and most other leading outlets for heavy chemicals are pressing for deliveries under contracts and there has been no lack of additional inquiry during the past few days both from home users and for export. The demand for fertilisers has again displayed some improvement, and activity is reported in pretty well all descriptions of tar products, especially the light distillates.

Next Week's Events

continued from page 679

THURSDAY 22 NOVEMBER

The Chemical Society

Bristol: University, 7 p.m. Dr. B. K. Kelly: 'Developments in Antibiotics'.

Hull: University College, 6 p.m. Professor J. W. Cook: 'The Structural Chemistry of Colchicine and some of its Biological Properties'.

Leeds: University, 6.30 p.m. Tilden Lecture. Professor D. H. Hey: 'Some Recent Developments in the Chemistry of Free Radical Reactions in Solution'.

Nottingham: University, 4.45 p.m. (with Nottingham University Chemical Society). Professor C. E. H. Bawn: 'Reactions of Hydrocarbon Radicals'.

FRIDAY 23 NOVEMBER

The Chemical Society

Newcastle-upon-Tyne: King's College, 5.30 p.m. Bedson Club Lecture. Professor R. P. Linstead: 'The Transfer of Hydrogen between Organic Compounds'.

Gaskets, washers, sealing rings and packings of "Klingerit" do not fall down on the job—and on present-day oil processing installations where the temperature of the crude oil often reaches 900°F., that is saying something!

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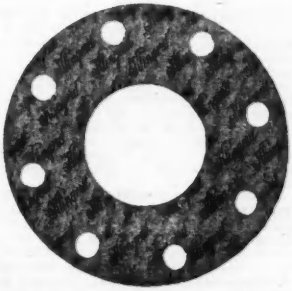

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CLASSIFIED ADVERTISEMENTS

SITUATIONS VACANT

AMENDED

SENIOR SCIENTIFIC OFFICERS, SCIENTIFIC OFFICERS. The Civil Service Commissioners invite applications for permanent appointments to be filled by competitive interview during 1951. Successful candidates may be appointed immediately. The posts are in various Government departments and cover a wide range of scientific research and development in most of the major fields of fundamental and applied science. Candidates must have obtained a University Degree with first or second class honours in a scientific subject (including engineering) or in mathematics, or an equivalent qualification, or possess high professional attainments. Candidates for Senior Scientific Officer posts must in addition have had at least three years' post-graduate or other approved experience.

Age limits: For senior Scientific Officers, at least 26 and under 31 on 1st August, 1951; for Scientific Officers, at least 21 and under 28 (or under 31 for permanent members of the Experimental Officer class) on 1st August, 1951. London salary scales. Senior Scientific Officers (men): £750–£950; (women) £625–£850. Scientific Officers (men): £400–£650; (women) £400–£525. Somewhat lower rates in provinces.

Further particulars from: **CIVIL SERVICE COMMISSION, SCIENTIFIC BRANCH, TRINIDAD HOUSE, OLD BURLINGTON STREET, LONDON, W.1,** quoting No. 3399.
13572/40/JW.

A PROMINENT Firm of Chemical Engineers in S.W. London have a vacancy in their laboratory for an **ASSISTANT CHEMIST.** The work will lie partially in the laboratory, but some field work on plant may also be involved from time to time. Candidates should have a Degree in Chemistry and preferably some industrial experience. Age limits, 23-28 years. Salary would depend on age, experience and qualifications, and would lie initially within the range £450-£650 per annum. Profit sharing and pension schemes are in operation. Apply **BOX No. V.4459, BENSONS, KINGSWAY HALL, KINGSWAY, W.C.2.**

PHYSICAL CHEMISTS required by the Division of Atomic Energy (Production), Research and Development Branch, Culcheth, Nr. Warrington, to assist in research on corrosion, electro-chemistry, thermochemistry, surface chemistry and constitution of alloys.

Candidates must be 28 or over and have at least Higher School Certificate with principal chemistry, but higher qualifications would be an advantage. Experience in research in one of the above fields is essential.

Salaries will be assessed according to qualifications and experience within the range £742–£960 p.a. (over age 35) or £545–£695 p.a. (28-35). Rates for women are somewhat lower.

Applications to: **MINISTRY OF SUPPLY, D.AT.EN (P), RISLEY, Nr. WARRINGTON, LANCS.,** stating post applied for.
RS. 9070-FH

THE London Office of a large Firm of Oil Refinery Constructional Engineers require a **PROGRESS ENGINEER** having wide experience of co-ordinating and supervising all branches of Oil Refinery Work, together with ability of interpreting the requirements of the clients. The candidate must have an Honours Degree in an appropriate branch of Engineering and possess an outstanding personality, good health and capability for hard work. A very high standard of achievement is required. All candidates should give full but concise details of their career and previous experience, which will be considered as confidential. Application should be sent to **BOX NO. 34, c/o BROWNS, 37, TOTHILL STREET, S.W.1.**

SITUATIONS VACANT

VACANCIES for **CHEMICAL ENGINEERS** for Technical Sales and Design Departments of North East Coast Engineering Firm. Graduates with industrial experience preferred. Permanent posts with good prospects. Apply **BOX NO. C.A.3062,** THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4, quoting reference C.E.

WANTED by a small rapidly expanding firm of chemical merchants and manufacturers, young man to have charge of sales and development work. Must have good industrial chemical knowledge combined with commercial experience or leanings. Central London. Reply giving full details, salary, etc., to **BOX NO. 3060,** THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

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2 ELECTROSTATIC PRECIPITATION PLANTS by Siemens Lurgi Cottrell, each with twin insulated collecting chambers containing Electrodes and shaking gear. Chamber dimensions, 62 ft. 6 in. high overall by 11ft. 9 in. by 10 ft. Complete with fan, cyclone and dust collecting and 20 kVA transformer.

2 vert. **GAS COOLERS,** each approx. 12 ft. dia. by 55 ft. high, constructed 12 mm. plate, tile lined and part filled ceramic rings, with water spray diffusers and all fittings, including cool water pumps. Cap. of each Cooler 29,000 M³/hour (1,020,000 cu. ft. per hour), cooling from 220° to 20° C.

3 **AIR FANS** by Carl Encke & Co., type VL6, cap. 15,000 M³/hour (530,000 cu. ft. per hour), end pressure 1.1 atm. (16 p.s.i.), 1,000 mm. (40 in.) water column, 500 mm. (20 in.) i.d. suction, 400 mm. (16 in.) i.d. pressure. Approx. 80 kW (100-h.p.) required to drive.

2 **FANS** by Benno Schilde, cap. 29,500 M³/hour (1,040,000 cu. ft. per hour), 1,000 mm. (40 in.) water column for gas 220° C. Approx. 150-kW (200 h.p. required to drive.

Qty. Parallel Slide **STOP VALVES** for gas and water Sizes ranging from 65 mm. (2½ in.) to 1,000 mm. (40 in.).

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Tel.: Pudsey 2241

1 **"FOUNTAIN" M.S. VERTICAL MIXER,** capacity approx. 7 cwt. Bottom discharge, continuous blade, fast and loose pulley drive, ball bearings. As new. Price £70. **BOX No. C.A. 3065,** THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

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TWO—60 in. and **ONE** 48 in. by **BROADBENT,** all electric, under-driven, direct coupled.
TWO—42 in. by **WATSON LAIDLAW,** all electric, under-driven through Vee ropes from flange mounted vertical spindle motor, 3-point suspension.
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Selection of **JACKETED PANS** from 40 to 450 gallon arranged with stirring gear from fast and loose pulley or electric motor and gearbox.
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DRUM MIXER, 6 ft. by 2 ft. 4 in. (inside). Two manhole covers. Heavy spur gearing.
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